OXIDIZERS - TOXIC (LIQUID) GUIDE

EMERGENCY RESPONSE

EIRE

- Use water, Do not use dry chemicals or foams, CO, or Halon⁹ may provide limited control.
- Flood fire area with water from a distance.
- Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.
 Fire involving Tanks or Car/Trailer Loads
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILLORILEAK

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift.
 Do not get water inside containers.

Small Liquid Spill

 Use a non-combustible material like vermiculite or sand to soak up the product and place into a container for later disposal.

Large Spill

Dike far ahead of liquid spill for later disposal.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.

- Remove and isolate contaminated clothing and shoes.

 Contaminated clothing may be a fire risk when dry.

 In case of contact with substance, immediately flush skin or eyes with running water for at least
- Keep victim calm and warm

OXIDIZERS (UNSTABLE) GUIDE

EMERGENCY RESPONSE

EIRE

Small Fire

- Use water. Do not use dry chemicals or foams. CO, or Halon⁹ may provide limited control. Large Fire
- Flood fire area with water from a distance.
- Do not move cargo or vehicle if cargo has been exposed to heat. Move containers from fire area if you can do it without risk.
- Do not get water inside containers: a violent reaction may occur.
 Fire involving Tanks or Car/Trailer Loads
- Cool containers with flooding quantities of water until well after fire is out. Dike fire-control water for later disposal.

- ALWAYS stay away from tanks engulfed in fire.

 For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK.

- Keep combustibles (wood, paper, oil, etc.) away from spilled material.

 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Use water spray to reduce vapors or divert vapor cloud drift.

 Prevent entry into waterways, sewers, basements or confined areas

Small Spill

Flush area with flooding quantities of water.

Large Spill

DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRSTAID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.

- Contaminated clothing may be a fire risk when dry.

 In case of contact with substance, immediately flush skin or eyes with running water for at least
- · Keep victim calm and warm.

GUIDE OXIDIZERS (UNSTABLE)

POTENTIAL HAZARDS

- EIREORIEXPLOSION
- May explode from friction, heat or contamination.

 These substances will accelerate burning when involved in a fire.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- Some will react explosively with hydrocarbons (fuels).
- Containers may explode when heated
- Runoff may create fire or explosion hazard

HEALTH

- TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death
- Fire may produce irritating and/or toxic gases.
- Toxic furnes or dust may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.). Runoff from fire control or difution water may cause pollution.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 teet) for liquids and at least 25 meters (75 leet) for solids.
- Keep unauthorized personnel away. Stay upwind, uphill and/or upstream
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).

 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Billet of the tremma processor.

 Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

See Ratio : Additional Solution and Armeditor Addition Stances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product, Please consult the shipping document and/or the ERAP Program Section (page 391).

GUIDE OXIDIZERS (WATER-REACTIVE) 144

POTENTIAL HAZARDS

EIRE OR EXPLOSION

- May ignite combustibles (wood, paper, oil, clothing, etc.).
- React vigorously and/or explosively with water.

 Produce toxic and/or corrosive substances on contact with water.
- Flammable/toxic gases may accumulate in tanks and hopper cars.
- Some may produce flammable hydrogen gas upon contact with metals.
- Containers may explode when heated.
- Runoff may create fire or explosion hazard

HEALTH

- TOXIC; inhalation or contact with vapor, substance, or decomposition products may cause severe injury
- Fire will produce irritating, corrosive and/or toxic gases. Runoff from fire control or dilution water may cause pollution

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate soill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream
- Ventilate closed spaces before entering

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See and printed speaking to proceed the printed and printed materials. For nonhighlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is Involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



OXIDIZERS (WATER-REACTIVE) GUDE

EMERGENCY RESPONSE

FIRE

DO NOT USE WATER OR FOAM.

Small Fire

Dry chemical, soda ash or lime.

Large Fire

DRY sand, dry chemical, soda ash or lime or withdraw from area and let fire burn.

Do not move cargo or vehicle if cargo has been exposed to heat Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles

Cool containers with flooding quantities of water until well after fire is out.

Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

ALWAYS stay away from tanks engulled in fire.

SPILE OR LEAK

ELIMINATE all iguition sources (no smoking, flares, sparks or flames in immediate area).
 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Stop leak if you can do it without risk.

Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled

DO NOT GET WATER on spilled substance or inside containers.

 Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.

Large Spill

DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves

Move victim to fresh air.

Move votint to tresh air.

Call 911 or emergency medical service.

Give artificial respiration if victim is not breathing.

Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Administer oxygen if breathing is difficult.

Remove and isolate contaminated clothing and shoes.

Contaminated clothing may be a fire risk when dry.

In case of contact with substance, immediately flush skin or eyes with running water for at least

Keeo victim calm and warm.

Keep victim under observation.

Effects of contact or inhalation may be delayed.

ORGANIC PEROXIDES (HEAT AND CONTAMINATION SENSITIVE)

GUIDE 145

EMERGENCY RESPONSE

EIRE

Small Fire

· Water spray or fog is preferred; if water not available use dry chemical, CO, or regular foam. Large Fire

Flood fire area with water from a distance.

Use water spray or fog; do not use straight streams.

Do not move cargo or vehicle if cargo has been exposed to heat. Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 Cool containers with flooding quantities of water until well after fire is out.

ALWAYS stay away from tanks engulled in fire.

For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILLORILEAK

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

Reep combined sourced upon the state of the

Keep substance wet using water spray. Stop leak if you can do it without risk.

Pick up with inert, damp, non-combustible material using clean, non-sparking tools and place into loosely covered plastic containers for later disposal.

Large Spill
Wet down with water and dike for later disposal.

Prevent entry into waterways, sewers, basements or confined areas.

DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

EIRST AID

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Move victim to fresh air.

Call 911 or emergency medical service.

Give artificial respiration if victim is not breathing.

Administer oxygen if breathing is difficult.

Remove and isolate contaminated clothing and shoes.

Contaminated clothing may be a fire risk when dry.

Remove material from skin immediately.

In case of contact with substance, immediately flush skin or eyes with running water for at least

20 minutes.

Keep victim calm and warm.

GUIDE **ORGANIC PEROXIDES** (HEAT AND CONTAMINATION SENSITIVE) 145

POTENTIAL HAZARDS

EIREOREXPLOSION May explode from heat or contamination

May Ignite combustibles (wood, paper, oil, clothing, etc.). May be Ignited by heat, sparks or flames.

May burn rapidly with flare-burning effect. Containers may explode when heated.

Runoff may create fire or explosion hazard

HEACTH

Fire may produce irritating, corrosive and/or toxic gases.
 Ingestion or contact (skin, eyes) with substance may cause severe injury or burns.
 Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for figurids and at least 25 meters (75 feet) for solids.

Keep unauthorized personnel away.

Stay upwind, uphill and/or upstream.

PROTECTIVE CLOTHING

Wear positive pressure self-contained breathing apparatus (SCBA).
Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.

Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

Consider initial evacuation for at least 250 meters (800 feet) in all directions

. If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

GUIDE ORGANIC PEROXIDES (HEAT, CONTAMINATION AND FRICTION SENSITIVE) 146

POTENTIAL HAZARDS

EIRE OR EXPLOSION

May explode from heat, shock, friction or contamination.

May ignite combustibles (wood, paper, oil, clothing, etc.)
May be ignited by heat, sparks or flames.

May burn rapidly with flare-burning effect. Containers may explode when heated.

Runoff may create fire or explosion hazard.

HEALTH

Fire may produce irritating, corrosive and/or toxic gases.

Ingestion or contact (skin, eyes) with substance may cause severe injury or burns.

Runoff from fire control or dilution water may cause pollution

PUBLIC SAFETY

CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids. Keep unauthorized personnel away.

Stay upwind, uphill and/or upstream

PROTECTIVE CLOTHING

Wear positive pressure self-contained breathing apparatus (SCBA).

Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.

Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

Consider initial evacuation for at least 250 meters (800 feet) in all directions,

 If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



ORGANIC PEROXIDES (HEAT, CONTAMINATION AND FRICTION SENSITIVE)

EMERGENCY RESPONSE

EIRE

Small Fire

- Water spray or fog is preferred; if water not available use dry chemical, CO2 or regular foam.
- Flood fire area with water from a distance
- Use water spray or fog; do not use straight streams.

 Do not move cargo or vehicle if cargo has been exposed to heat.
- Move containers from fire area if you can do it without risk.
 Fire involving Tanks or Car/Trailer Loads
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out.
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILLOR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Keep substance wet using water spray.
- Stop leak if you can do it without risk.

Small Spill

Pick up with inert, damp, non-combustible material using clean, non-sparking tools and place into loosely covered plastic containers for later disposal.

Large Spill

- Wet down with water and dike for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

 DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry. Remove material from skin immediately.
- In case of contact with substance, immediately flush skin or eyes with running water for at least · Keeo victim calm and warm.

GUIDE 146

LITHIUM ION BATTERIES GUIDE 147

EMERGENCY RESPONSE

EIRE

all Fire

- Dry chemical, CO₂, water spray or regular foam.
- Water spray, fog or regular foam.
- · Move containers from fire area if you can do it without risk.

SPILL OR LEAK

- ELIMINATE all Ignition sources (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material.
- Absorb with earth, sand or other non-combustible material
- Leaking batteries and contaminated absorbent material should be placed in metal containers.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.

 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least

GUIDE LITHIUM ION BATTERIES

POTENTIAL HAZARDS

- FIRE ORIEXPLOSION Lithium ion batteries contain flammable liquid electrolyte that may vent, Ignite and produce sparks when subjected to high temperatures (> 150 °C (302 °F)), when damaged or abused (e.g., mechanical damage or electrical overcharging).

 May burn rapidly with flare-burning effect.
- · May ignite other batteries in close proximity.

HEALTH

- Contact with battery electrolyte may be irritating to skin, eyes and mucous memoranes. Fire will produce irritating, corrosive and/or toxic gases. Burning batteries may produce toxic hydrogen fluoride gas (see GUIDE 125).

- · Fumes may cause dizziness or suffocation

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first, If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all
- directions
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream. Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA)
- Structural firefighters' protective clothing will only provide limited protection

EVACUATION

- Large Spill
- Consider initial downwind evacuation for at least 100 meters (330 feet).
- If rail car or trailer is involved in a fire, ISOLATE for 500 meters (1/3 mile) in all directions; also initiate evacuation including emergency responders for 500 meters (1/3 mile) in all directions.

GUIDE ORGANIC PEROXIDES (HEAT AND CONTAMINATION SENSITIVE/TEMPERATURE CONTROLLED) 148

POTENTIAL HAZARDS

FIRE OR EXPEOSION

- May explode from heat, contamination or loss of temperature control.
- These materials are particularly sensitive to temperature rises. Above a given "Control Temperature" they decompose violently and catch fire.
- May ignite combustibles (wood, paper, oil, clothing, etc.).
- May ignite spontaneously if exposed to air. May be ignited by heat, sparks or flames.
- May burn rapidly with flare-burning effect. Containers may explode when heated.
- Runoff may create fire or explosion hazard.

HEALTH:

- Fire may produce irrilating, corrosive and/or toxic gases.
 Ingestion or contact (skin, eyes) with substance may cause severe injury or burns.
 Runoff from fire control or dilution water may cause pollution.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away
- Stay upwind, uphill and/or upstream
- DO NOT allow the substance to warm up. Obtain liquid nitrogen (wear thermal protective clothing, see GUIDE 120), dry ice or ice for cooling. If this is not possible or none can be obtained, evacuate the area immediately.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SC8A)
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

- Large Spil
- Consider initial evacuation for at least 250 meters (800 feet) in all directions
- If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



ORGANIC PEROXIDES (HEAT AND CONTAMINATION SENSITIVE/TEMPERATURE CONTROLLED)

GUIDE

EMERGENCY RESPONSE

EIRE

The temperature of the substance must be maintained at or below the "Control Temperature" at times.

Small Fire

Water spray or fog is preferred; if water not available use dry chemical, CO, or regular foam.

- Large Fire
 Flood fire area with water from a distance.
- Use water spray or fog; do not use straight streams.
 Do not move cargo or vehicle if cargo has been exposed to heat.
 Move containers from fire area if you can do it without risk.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out. BEWARE OF POSSIBLE CONTAINER EXPLOSION.

- ALWAYS stay away from tanks engulled in fire.

 For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep combustibles (wood, paper, oil. etc.) away from spilled material. Do not touch or walk through spilled material.

- Stop leak if you can do it without risk

Small Spill

Pick up with inert, damp, non-combustible material using clean, non-sparking tools and place into loosely covered plastic containers for later disposal.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.
 DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service. Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

 Remove and isolate contaminated clothing and shoes.
- Contaminated clothing may be a fire risk when dry. Remove material from skin immediately.
- . In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- · Keep victim calm and warm.

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SUBSTANCES (SELF-REACTIVE) GUIDE

EMERGENCY RESPONSE

EIRE

Dry chemical, CO₂, water spray or regular foam.

Large Fire

- Flood fire area with water from a distance.
 Move containers from fire area if you can do it without risk. Fire involving Tanks or Car/Trailer Loads
 BEWARE OF POSSIBLE CONTAINER EXPLOSION.

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after lire is out.
 Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
 Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

- Pick up with inert, damp, non-combustible material using clean, non-sparking tools and place into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Keep victim calm and warm.

GUIDE SUBSTANCES (SELF-REACTIVE)

POTENTIAL HAZARDS

EIREIORIEXPLOSION

- Self-decomposition, self-polymerization, or self-ignition may be triggered by heat, chemical reaction, friction or impact.
- May be ignited by heat, sparks or flames.
- Some may decompose explosively when heated or involved in a fire.

 Those substances designated with a (P) may polymerize explosively when heated or involved in a fire.
- May burn violently. Decomposition or polymerization may be self-accelerating and produce large amounts
 - Vapors or dust may form explosive mixtures with air.

HEALTH

- Inhalation or contact with vapors, substance or decomposition products may cause severe injury or death.
- May produce irritating, toxic and/or corrosive gases.
- Runoff from fire control may cause pollution

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first, If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA)
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection
- Structural firefighters' protective clothing will only provide limited protection

EVACUATION

- Large Spill

 Consider initial evacuation for at least 250 meters (800 feet) in all directions.

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

GUIDE SUBSTANCES (SELF-REACTIVE/ TEMPERATURE CONTROLLED) 150

POTENTIAL HAZARDS

EIRE OR EXPLOSION

- Self-decomposition, self-polymerization, or self-ignition may be triggered by heat, chemical reaction, friction or impact.
- Self-accelerating decomposition may occur if the specific control temperature is not maintained.
- These materials are particularly sensitive to temperature rises. Above a given "Control Temperature" they decompose or polymerize violently and may catch fire. May be ignited by heat, sparks or flames.
- Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Some may decompose explosively when heated or involved in a fire.

 May burn violently, Decomposition or polymerization may be self-accelerating and produce large amounts
- of gases. Vapors or dust may form explosive mixtures with air.
- HEALTH

- Inhalation or contact with vapors, substance or decomposition products may cause severe injury or
- May produce irritating, toxic and/or corrosive gases.
- Runoff from fire control may cause pollution

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away. Stay upwind, uphill and/or upstream.
- DO NOT allow the substance to warm up. Obtain liquid nitrogen (wear thermal protective clothing, see GUIDE 120), dry ice or ice for cooling. If this is not possible or none can be obtained, evacuate the area immediately.

PROTECTIVE CLOTHING

- Near positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Consider initial evacuation for at least 250 meters (800 feet) in all directions.

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



SUBSTANCES (SELF-REACTIVE/ TEMPERATURE CONTROLLED)

GUIDE

EMERGENCY RESPONSE

- The temperature of the substance must be maintained at or below the "Control Temperature" at al Small Fire
- Dry chemical, CO₂, water spray or regular foam.

Large Fire

- Flood fire area with water from a distance.
- Move containers from fire area if you can do it without risk.
 Fire involving Tanks or Car/Trailer Loads

- BEWARE OF POSSIBLE CONTAINER EXPLOSION.
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.

 Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire.

SPJEL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.

Small Spill

- Pick up with inert, damp, non-combustible material using clean, non-sparking tools and place into loosely covered plastic containers for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

 DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes,
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Keep victim calm and warm.

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SUBSTANCES - TOXIC (NON-COMBUSTIBLE) GUIDE

EMERGENCY RESPONSE

FIRE

- Dry chemical, CO₂ or water spray.
- Large Fire
- Water spray, log or regular foam.

 Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material. Use water spray or fog; do not use straight streams.
- Fire involving Tanks or Car/Trailer Loads
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
 Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

 For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- Do not louch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Cover with plastic sheet to prevent spreading.

 Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.

 Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial
- respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breatning is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- For minor skin contact, avoid spreading material on unaffected skin.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

GUIDE SUBSTANCES - TOXIC (NON-COMBUSTIBLE)

POTENTIAL HAZARDS

HEALTH

- Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution

EIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic furnes.
- Containers may explode when heated.
 Runoff may pollute waterways.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids,
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream

PROTECTIVE CEOTHING

- Wear postive pressure self-contained breathing apparatus (SCBA).

 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firelighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill See Enter thinks open an and reserve across Delance (or highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391)

Table 7 Dalla

GUIDE SUBSTANCES - TOXIC (COMBUSTIBLE) 152

POTENTIAL HAZARDS

HEALTH

- Highly toxic, may be fatal if inhaled, swallowed or absorbed through skin.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
- Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution

FIRE OR EXPLOSION

- Combustible material: may burn but does not ignite readily.
 Containers may explode when heated.
- · Runoff may pollute waterways
- Substance may be transported in a molten form

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away. Stay upwind, uphill and/or upstream

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See Taggace Initial Solator and Constitution of the Section of the Initial Solation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



SUBSTANCES - TOXIC (COMBUSTIBLE) GUIDE

EMERGENCY RESPONSE

EIRE

Dry chemical, CO, or water spray.

- Water spray, fog or regular foam.
 Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.
- Use water spray or fog; do not use straight streams.

- Fire involving Tanks or Car/Trailer Loads

 Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank
- ALWAYS stay away from tanks engulfed in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas Cover with plastic sheet to prevent spreading.
- Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET WATER INSIDE CONTAINERS.

EIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.

 Give artificial respiration if victim is not breathing.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult. Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim calm and warm.
- · Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

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GUIDE

SUBSTANCES - TOXIC AND/OR CORROSIVE (COMBUSTIBLE)

EMERGENCY RESPONSE

EIRE

Small Fire

- Dry chemical, CO₂ or water spray.
- Large Fire
- Dry chemical, CO₂, alcohol-resistant foam or water spray.
 Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
 Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
- DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

 Move victim to fresh air.

- Call 911 or emergency medical service.

 Give artificial respiration if victim is not breathing.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
 In case of contact with substance, immediately flush skin or eyes with running water for at least
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim calm and warm.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

GUIDE SUBSTANCES - TOXIC AND/OR CORROSIVE (COMBUSTIBLE) 153

HEALTH

POTENTIAL HAZARDS

- TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death. Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.
 Fire may produce irritating, corrosive and/or toxic gases,
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution

FIRE OR EXPLOSION

- Combustible material: may burn but does not ignite readily.

 When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion hazards.
- Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated.
- Runoff may pollute waterways.
- Substance may be transported in a molten

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keen unauthorized personnel away.
- Stay upwind, uphill and/or upstream.
- Ventilate enclosed areas

PROTECTIVE GLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firelighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION Spill

See able to transact solar mental stoler investment statutes for highlighted materials. For nonhighlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If lank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product, Please consult the shipping document and/or the ERAP Program Section (page 391).

GUIDE SUBSTANCES - TOXIC AND/OR CORROSIVE (NON-COMBUSTIBLE) 154

POTENTIAL HAZARDS

- HEALTH TOXIC; inhalation, ingestion or skin contact with material may cause severe injury or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Avoid any skin contact.
- Effects of contact or inhalation may be delayed.

 Fire may produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic furnes.

- Some are oxidizers and may ignite combustibles (wood, paper, oil, clothing, etc.).
 Contact with metals may evolve flammable hydrogen gas.
 Containers may evpolde when heated.
 For electric vehicles or equipment, GUIDE 147 (tithium ion batteries) or GUIDE 138 (sodium batteries) should also be consulted. PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first, If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

 As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream, Ventilate enclosed areas.
- PROTECTIVE CLOTHING
- Wear positive pressure self-contained breathing apparatus (SCBA).

 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide
- little or no thermal protection.

 Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See The similar solution and Professive Autors standing for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



Substances - Toxic and/or Corrosive (Non-Combustible)

GUIDE

EMERGENCY RESPONSE

EIRE Small Fire

- · Dry chemical, CO, or water spray
- Large Fire
- Dry chemical, CO₂, alcohol-resistant foam or water spray.
 Move containers from fire area if you can do it without risk
- Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- · Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulled in fire.

SPILLORLEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.

 Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. DO NOT GET WATER INSIDE CONTAINERS.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect
- Move victim to fresh air.
- Call 911 or emergency medical service.

- Give artificial respiration if victim is not breathing.

 Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.

 In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.
- Keeo victim calm and warm.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

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GUIDE

SUBSTANCES - TOXIC AND/OR CORROSIVE (FLAMMABLE/WATER-SENSITIVE)

EMERGENCY RESPONSE

- Note: Most foams will react with the material and release corrosive/toxic gases.
 CAUTION: For Acetyl chloride (UN1717), use CO, or dry chemical only. Small Fire
- CO, dry chemical, dry sand, alcohol-resistant foam.

Large Fire

- Water soray, fog or alcohol-resistant foam
- FOR CHLOROSILANES, DO NOT USE WATER; use AFFF alcohol-resistant medium-expansion foam.
- Move containers from fire area if you can do it without risk. Use water spray or fog; do not use straight streams.

- Fire Involving Tanks or Car/Trailer Loads
 Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.

 Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulied in fire.

- FSPURSON LEAK

 ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.

 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- A vapor-suppressing foam may be used to reduce vapors.
- FOR CHLOROSILANES, use AFFF alcohol-resistant medium-expansion foam to reduce vapors. DO NOT GET WATER on spilled substance or inside containers.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Prevent entry into waterways, sewers, basements or confined areas.

Small Spill

- Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.
- Use clean, non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

EIRSTAID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect
- · Call 911 or emergency medical service Move victim to fresh air.
- Give artificial respiration if victim is not breathing.

 Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper

- respiratory with the art of a pocket mean equipped mind a one-may rate of state pro-respiratory medical device.

 Administer oxygen if breathing is difficult.

 Remove and solate contaminated clothing and shoes.

 In case of contact with substance, immediately flush skin or eyes with running water for at least

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- 20 minutes.
 For minor skin contact, avoid spreading material on unaffected skin.
- Keeo victim calm and warm.
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

GUIDE 155

SUBSTANCES - TOXIC AND/OR CORROSIVE (FLAMMABLE/WATER-SENSITIVE)

POTENTIAL HAZARDS

- IFIRE OF EXELOSION

 HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames
- Vapors form explosive mixtures with air: Indoors, outdoors and sewers explosion hazards.

 Most vapors are heavier than air. They will spread along ground and collect in low or confined areas
- (sewers, basements, tanks).
- Vapors may travel to source of ignition and flash back.
- Those substances designated with a (P) may polymerize explosively when heated or involved in a fire. Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff.
- Contact with metals may evolve flammable hydrogen gas
- Containers may explode when heated or if contaminated with water.

HEALTH

- TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death
- Bromoacetates and chloroacetates are extremely irritating/lachrymators.
- Reaction with water or moist air will release toxic, corrosive or flammable gases.

 Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.

 Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream.

Ventilate enclosed areas

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).

 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firelighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION.

See Manage Initialized by the Committee of the Committee of the Initialized Branch State of th

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

GUIDE SUBSTANCES - TOXIC AND/OR CORROSIVE (COMBUSTIBLE/WATER-SENSITIVE) 156

POTENTIAL HAZARDS

FIREOREXPLOSION

- Combustible material; may burn but does not ignite readily.

 Substance will react with water (some violently) releasing flammable, toxic or corrosive gases and runoff.
- When heated, vapors may form explosive mixtures with air: indoors, outdoors and sewers explosion
- Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Vapors may travel to source of ignition and flash back.
 Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

HEALTH

- TOXIC; Inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Contact with molten substance may cause severe burns to skin and eyes.
- Reaction with water or moist air will release toxic, corrosive or flammable gases. Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution

- PUBLIC SAFETY

 CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream. Ventilate enclosed areas.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).

 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.

Structural fire[in]ter's protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See Lance Commission and Commission

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



SUBSTANCES - TOXIC AND/OR CORROSIVE (COMBUSTIBLE/WATER-SENSITIVE)

GUIDE 156

EIBE

Note: Most foams will react with the material and release corrosive/toxic gases.

Small Fire

dry chemical, dry sand, alcohol-resistant foam.

Large Fire

Water spray, log or alcohol-resistant foam.

FOR CHLOROSILANES, DO NOT USE WATER; use AFFF alcohol-resistant medium-expansion foam.

EMERGENCY RESPONSE

Move containers from fire area if you can do it without risk.

Use water spray or fog; do not use straight streams.
 Fire involving Tanks or Car/Trailer Loads

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 Do not get water inside containers.

Cool containers with flooding quantities of water until well after fire is out.

Withdraw immediately in case of rising sound from venting safety devices or discoloration of lank.

ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

ELIMINATE all lignition sources (no smoking, flares, sparks or flames in immediate area).

All equipment used when handling the product must be grounded.

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Stop leak if you can do it without risk,

A vapor-suppressing foam may be used to reduce vapors.

FOR CHLOROSILANES, use AFFF alcohol-resistant medium-expansion foam to reduce vapors.

DO NOT GET WATER on spilled substance or inside containers

Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.

Prevent entry into waterways, sewers, basements or confined areas

Small Spill

 Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.

Use clean, non-sparking tools to collect material and place it into loosely covered plastic containers for

later disposal.

FIRST AID

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Move victim to fresh air. Call 911 or emergency medical service.

 Give artificial respiration if victim is not breathing.
 Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Administer oxygen if breathing is difficult.

Remove and isolate contaminated clothing and shoes.

In case of contact with substance, immediately flush skin or eyes with running water for at least

For minor skin contact, avoid spreading material on unaffected skin.

Keep victim calm and warm. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

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SUBSTANCES - TOXIC AND/OR CORROSIVE (NON-COMBUSTIBLE/WATER-SENSITIVE)

EMERGENCY RESPONSE

GUIDE 157

FIRE

Note: Some foams will react with the material and release corrosive/toxic gases Small Fire

CO, (except for Cyanides), dry chemical, dry sand, alcohol-resistant foam.

Large Fire

Water spray, fog or alcohol-resistant foam.

Move containers from fire area if you can do it without risk.
Use water spray or fog; do not use straight streams.

Dike fire-control water for later disposal; do not scatter the material.
 Fire involving Tanks or Car/Trailer Loads

Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

Do not get water inside containers.

Cool containers with flooding quantities of water until well after fire is out.

Wilhdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

ALWAYS stay away from tanks engulfed in fire.

SPILL OR LEAK

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

All equipment used when handling the product must be grounded.

Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

Stop leak if you can do it without risk.

A vapor-suppressing foam may be used to reduce vapors.

DO NOT GET WATER INSIDE CONTAINERS.

Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.

Prevent entry into waterways, sewers, basements or confined areas

Small Spill

Cover with DRY earth, DRY sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain.

Use clean, non-sparking tools to collect material and place it into loosely covered plastic containers for later disposal.

FIRSTAID:

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect

Move victim to fresh air Call 911 or emergency medical service.

Move vicinit to learn an. Can's to enlarge they medical service.

Give artificial respiration if victim is not breathing.

Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Administer oxygen if breathing is difficult. • Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes

In case of contact with Hydrofluoric acid (UN1790), flush with large amounts of water. For skin contact, if cakium gluconate get is available, rinse 5 minutes, then apply get. Otherwise, continue rinsing until medical treatment is available. For eyes, flush with water or a saline solution for 15 minutes.

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For minor skin contact, avoid spreading material on unaffected skin.

· Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.

SUBSTANCES - TOXIC AND/OR CORROSIVE (NON-COMBUSTIBLE/WATER-SENSITIVE) GUIDE

POTENTIAL HAZARDS

HEADIN

TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death:

Reaction with water or moist air may release toxic, corrosive or flammable gases.

Reaction with water may generate much heat that will increase the concentration of furnes in the air.

Fire will produce irritating, corrosive and/or toxic gases.
Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution

FIRE OR EXPLOSION

Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes

For UN1796, UN1826, UN2031 at high concentrations and for UN2032, these may act as oxidizers, also consult GUIDE 140.

Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars, etc.). Substance may react with water (some violently), releasing corrosive and/or toxic gases and runoff.

Contact with metals may evolve flammable hydrogen gas.

Containers may explode when heated or if contaminated with water

PUBLIC SAFETY

CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for solids.

Keep unauthorized personnel away.

Stay upwind, uphill and/or upstream,

Ventilate enclosed areas

PROTECTIVE CLOTHING

Wear positive pressure self-contained breathing apparatus (SCBA).

Wear chemical protective clothing that is specifically recommended by the manufacturer, It may provide little or no thermal protection.

Bluet of the terminal profession.

Structural fire(in)thers' professive clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

Spill

See <u>Table 11 initial season anni-hole-invalued userses</u> for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

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GUIDE INFECTIOUS SUBSTANCES 158

POTENTIAL HAZARDS

HEALTH Inhalation or contact with substance may cause infection, disease or death.

Category A Infections Substances (UN2814 or UN2900) are more hazardous, or are in a more hazardous form, than infectious substances shipped as Category B Biological Substances (UN3373) or clinical waste / medical waste (UN3291).

Runoff from fire control may cause environmental contamination.

Note: Damaged packages containing solid CO₂ as a refrigerant may produce water or frost from condensation of air. Do not touch this solid or liquid as it could be contaminated by the contents of the parcel.

Contact with solid CO₂ may cause burns, severe injury and/or frostbite

FIRE OR EXPLOSION

Some of these materials may burn, but none ignite readily.

Some may be transported in flammable liquids

PUBLIC SAFETY

CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all

Keep unauthorized personnel away.

Stay upwind, uphill and/or upstream. Identify the substance involved.

Wear respiratory protection, such as fit-tested N95 respirator (at minimum), powered air purifying respirator (PAPR), or positive pressure self-contained breathing apparatus (SCBA).

Wear full coverage body protection (e.g., Tyvek suit), faceshield, and disposable fluid-resistant gloves

Wear appropriate footwear; disposable shoe covers can be worn to protect against contamination. Puncture- and cut-resistant gloves should be worn over fluid-resistant gloves if sharp objects (e.g.,

broken glass, needles) are present. Wear insulated gloves (e.g. cryo gloves) over fluid-resistant gloves when handling dry ice (UN1845).

Decontaminate protective colthing and personal protective equipment after use and before cleaning or disposal with an appropriate chemical disinfectant (e.g., 10% solution of bleach, equivalent to 0.5% sodium hypochlorite) or through a validated decontamination technology (e.g., autoclave) or process. Structural firefighters' protective clothing will only provide limited protection



EMERGENCY RESPONSE

EIRE

Small Fire

- · Dry chemical, soda ash, lime or sand.
- Large Fire
- Use extinguishing agent suitable for type of surrounding fire.

 Do not scatter spilled material with high-pressure water streams.

 Move containers from fire area if you can do it without risk.

SPIEL OR EFAK

- Do not touch or walk through spilled material.

 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Absorb with earth, sand or other non-combustible material.
- Cover damaged package or spilled material with absorbent material such as paper towel, towel or rag to absorb any liquids, and, beginning from outside edge, pour liquid bleach or other chemical disinfectant to saturate. Keep wet with liquid bleach or other disinfectant.
- DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves
- Move victim to a safe isolated area.
- CAUTION: Victim may be a source of contamination.
- Call 911 or emergency medical service.
- Remove and isolate contaminated clothing and shoes
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Effects of exposure (inhalation, ingestion, injection/inoculation or skin contact) to substance may be delayed. Victim should consult medical professional for information regarding symptoms and treatment. For further assistance, contact your local Poison Control Center.

SUBSTANCES (IRRITATING) GUIDE 159

EMERGENCY RESPONSE

EIRE

all Fire

- Dry chemical, CO2, water spray or regular foam.
- Large Fire
- Water soray, fog or regular foam,
- Move containers from fire area if you can do it without risk.

 Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Do not get water inside containers.
- Cool containers with flooding quantities of water until well after fire is out.
 Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS stay away from tanks engulled in fire.

 For massive fire, use unmanned hose holders or monitor nozzles; If this is impossible, withdraw from area and let fire burn.

SPILL OF LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire.
- Pick up with sand or other non-combustible absorbent material and place into containers for later

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

EIRSTAID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- On not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes
- For minor skin contact, avoid spreading material on unaffected skin.
- Keep victim calm and warm
- Effects should disappear after individual has been exposed to fresh air for approximately 10 minutes.

GUIDE SUBSTANCES (IRRITATING)

POTENTIAL HAZARDS

SHEACTRI

- Inhalation of vapors or dust is extremely irritating.
- · May cause burning of eyes and flow of tears.
- May cause coughing, difficult breathing and nausea. Brief exposure effects last only a few minutes.
- Exposure in an enclosed area may be very harmful.
- Fire will produce irritating, corrosive and/or toxic gases · Runoff from fire control or dilution water may cause pollution.

EIRE OR EXPLOSION

- Some of these materials may burn, but none ignite readily
- . Containers may explode when heate

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream
- Ventilate closed spaces before entering

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA)
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See Table: Initial Solution and Report Adjoint Solution and Initial Solution and Initial Solution and Initial Solution and Initial Solution Adjoint Solution and Initial Solution Adjoint Adjoint Adjoint Adjoint Adjoint Solution Adjoint Adjoi

Fire

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).

GUIDE HALOGENATED SOLVENTS 160

POTENTIAL HAZARDS

HEALTH

- Toxic by ingestion.
- Vapors may cause dizziness or suffocation.
- Exposure in an enclosed area may be very harmful.
- Contact may irritate or burn skin and eyes.
- Fire may produce irrilating and/or toxic gases.
 Runoff from fire control or dilution water may cause pollution

FIRE OR EXPLOSION

- Some of these materials may burn, but none ignite readily.
- Most vapors are heavier than air.

 Air/vapor mixtures may explode when ignited.
- Container may explode in heat of fire

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
 Ventilate closed spaces before entering.

- PROTECTIVE CLOTHING

 Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer.
 Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spil

Consider initial downwind evacuation for at least 100 meters (330 feet).

 If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

HALOGENATED SOLVENTS GUIDE

EMERGENCY RESPONSE

EIRE

Dry chemical, CO, or water spray.

Large Fire

- Dry chemical, CO,, alcohol-resistant foam or water spray.
- Move containers from fire area if you can do it without risk.

 Dike fire-control water for later disposal; do not scatter the material.

Fire involving Tanks or Car/Trailer Loads

- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

ALWAYS stay away from tanks engulfed in fire.

SPILLORLEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak if you can do it without risk.

Small Liquid Spill

Pick up with sand, earth or other non-combustible absorbent material.

Large Spill

- Dike far ahead of liquid spill for later disposal.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

Move victim to fresh air.

- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
 For minor skin contact, avoid spreading material on unaffected skin.
- Wash skin with soap and water.
- Keep victim calm and warm.

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RADIOACTIVE MATERIALS (LOW LEVEL RADIATION)

GUIDE 161

EMERGENCY RESPONSE

FIRE

- sence of radioactive material will not influence the fire control processes and should not influence Presence of radioactive selection of techniques.
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Dry chemical, CO₂, water spray or regular foam.

Large Fire

Water spray, fog (flooding amounts).

SPILL OR LEAK Do not touch damaged packages or spilled material.

- Cover liquid spill with sand, earth or other non-combustible absorbent material.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

 Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.

 Use first ald treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities

GUIDE RADIOACTIVE MATERIALS (LOW LEVEL RADIATION) 161

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content
- Very low levels of contained radioactive materials and low radiation levels outside packages result in low risks to people. Damaged packages may release measurable amounts of radioactive material, but the
- resulting risks are expected to be low.

 Some radioactive materials cannot be detected by commonly available instruments
- Packages do not have RADIOACTIVE I, II, or III labels. Some may have EMPTY labels or may have the word "Radioactive" in the package marking.

FIREOREXPLOSION

- Some of these materials may burn, but most do not ignite readily.

 Many have cardboard outer packaging; content (physically large or small) can be of many different ohysical forms.
- Radioactivity does not change flammability or other

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 leet) in all
- Stay upwind, uphill and/or upstream.
- Keep unauthorized personnel away.

 Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection

EVACUATION

Large Spill

Consider initial downwind evacuation for at least 100 meters (330 feet).

When a large quantily of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

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GUIDE RADIOACTIVE MATERIALS (LOW TO MODERATE LEVEL RADIATION) 162

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content increases. Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure if contents are released.
- Low radiation hazard when material is inside container. If material is released from package or bulk container, hazard will vary from low to moderate. Level of hazard will depend on the type and amount of radioactivity, the kind of material it is in, and/or the surfaces it is on.
- Some material may be released from packages during accidents of moderate severity but risks to people

- are not year. Released radioactive materials or contaminated objects usually will be visible if packaging falls. Some exclusive use shipments of bulk and packaged materials will not have "RADIOACTIVE" labels. Placards, markings and shipping papers provide identification. Some packages may have a "RADIOACTIVE" label and a second hazard label. The second hazard is usually greater than the radiation hazard; so follow this GUIDE as well as the response GUIDE for the second hazard class label.
- Some radioactive materials cannot be detected by commonly available instruments.
- Runoff from control of cargo fire may cause low-level pollution.

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily.
- Uranium and Thorium metal cuttings may Ignite spontaneously if exposed to air (see GUIDE 136).
 Nitrates are oxidizers and may ignite other combustibles (see GUIDE 141).

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority
- for measuring radiation levels.

 Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind, uphill and/or upstream.
- Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters protective clothing will provide adequate protection.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet)
- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions. In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391).



RADIOACTIVE MATERIALS (LOW TO MODERATE LEVEL RADIATION)

EMERGENCY RESPONSE

EIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques.

 Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone.

Small Fire

Dry chemical, CO2, water spray or regular foam.

- Large Fire

 Water spray, log (flooding amounts).

 Dike lire-control water for later disposal.

SPILE OR LEAK

- Do not touch damaged packages or spilled material. Cover liquid spill with sand, earth or other non-combustible absorbent material.
- Dike to collect large liquid spills.
- Cover powder spill with plastic sheet or tarp to minimize spreading.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves.
- Call 911 or emergency medical service
- Medical problems take priority over radiological concerns. Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.

 In case of contact with substance, wipe from skin immediately; flush skin or eyes with running water for at least 20 minutes.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.

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GUIDE

RADIOACTIVE MATERIALS GUIDE (LOW TO HIGH LEVEL RADIATION)

EMERGENCY RESPONSE

EIRE

- Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone

- · Dry chemical, CO., water spray or regular foam. Large Fire
- Water spray, fog (flooding amounts).

 Dike fire-control water for later disposal.

SPICE OR LEAK

- Do not touch damaged packages or spilled material.
- Damp surfaces on undamaged or slightly damaged packages are seldom an Indication of packaging failure. Most packaging for liquid content have inner containers and/or inner absorbent materials. Cover liquid spill with sand, earth or other non-combustible absorbent material.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves.
- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns. Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person. Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 In case of contact with substance, immediately flush skin or eyes with running water for at least
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities

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GUIDE RADIOACTIVE MATERIALS (LOW TO HIGH LEVEL RADIATION) 163

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content

- increases.

 Undamaged packages are safe. Contents of damaged packages may cause higher external radiation exposure, or both external and internal radiation exposure of contents are released.

 Type A packages (cartons, boxes, drums, articles, etc.) identified as "Type A" by marking on packages or by shipping papers contain non-life-endangering amounts. Partial releases might be expected if "Type A" packages are damaged in moderately severe accidents.

 Type B packages, and the rarely occurring Type C packages (large and small, usually metal), contain the most hazardous amounts. They can be identified by package markings or by shipping papers.

 Life-threatening conditions may exist only if contents are released or package shielding fails. Because of design, evaluation and testing of packages, these conditions would be expected only for accidents of utmost severity.

 The rarely occurring "Special Arrangement" shipments may be of Type A, Type B or Type C packages. Package type will be marked on packages, and shipment details will be on shipping papers.

 Radioactive White-I labels indicate radiation levels outside single, isolated, undamaged packages are very low (less than 0.005 mSvM (0.5 mrem/h)).

 Radioactive Yellow-II and Yellow-III abeleded packages have higher radiation levels. The transport index

- Radioactive Yellow-II and Yellow-III labeled packages have higher radiation levels. The transport index (TI) on the label identifies the maximum radiation level in migm/n one meter from a single, isolated, undamaged package.

 Some radioactive materials cannot be detected by commonly available instruments.

Water from cargo fire control may cause pollution

FIRE OR EXPLOSION

- Some of these materials may burn, but most do not ignite readily
- Some or present materials has your journess of origine reason; Radioactivity does not change flammability or other properties of materials. Type B packages are designed and evaluated to withstand total engulfment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.

PUBLIC SAFETY

- PUBLICS AFETY

 CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.

 Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies. As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.

 Stay upwind, uphill and/or upstream.

 Keep unauthorized personnel away.

 Detain or isolate uninjured persons or equipment suspected to be contaminated, delay decontamination and cleanup until instructions are received from Radiation Authority.

- and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

EVACUATION

- Large Spill

 Consider initial downwind evacuation for at least 100 meters (330 feet).
- - When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

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GUIDE RADIOACTIVE MATERIALS (SPECIAL FORM) LOW TO HIGH LEVEL EXTERNAL RADIATION) 164

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential hazard of radioactive content

- increases.

 Undamaged packages are sale; contents of damaged packages may cause external radiation exposure, and much higher external exposure if contents (source capsules) are released.

 Contamination and internal radiation hazards are not expected, but not impossible.

 Type A packages (cartons, boxes, drums, articles, etc.) identified as "Type A' by marking on packages or by shipping papers contain non-life-endangering amounts. Radioactive sources may be released if "Type A' packages are damaged in moderately severe accidents.

 Type B packages, and the rarely occurring Type C packages, (large and small, usually metal) contain the most hazardous amounts. They can be identified by package markings or by shipping papers.

 Life-threatening conditions may exist only if contents are released or package shielding fails. Because of design, explautation and testing of packages, these conditions would be expected only for accidents of ulmost severity.
- Radioactive White-I labels indicate radiation levels outside single, isolated, undamaged packages are
- very low (less than 0.005 mSv/h (0.5 mrem/h)).
 Radioactive Yellow-II and Yellow-III labeled packages have higher radiation levels. The transport index (TI) on the label identifies the maximum radiation level in mrem/h one meter from a single, isolated, undamaged package.
- Radiation from the package contents, usually in durable metal capsules, can be detected by most radiation instruments.

 Water from cargo fire control is not expected to cause pollution.

FIRE OR EXPLOSION

- The Conference of the Conference of Source Capsule.

 Radioactivity does not change llammability or other properties of materials.

 Radioactivity does not change llammability or other properties of materials.

 Radioactive source capsules and Type B packages are designed and evaluated to withstand total engultment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Priorities for rescue, life-saving, first a did, fire control and other hazards are higher than the priority for measuring radiation levels.

 Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.

 As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions.
- Stay upwind, uphill and/or upstream.
 Keep unauthorized personnel away.
 Delay final cleanup until instructions or advice is received from Radiation Authority.

PHOTECTIVECTOTHING

Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

EVACUATION

Large Spill

- Consider initial downwind evacuation for at least 100 meters (330 feet).
- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

RADIOACTIVE MATERIALS (SPECIAL FORM/ LOW TO HIGH LEVEL EXTERNAL RADIATION)

GUIDE 164

EMERGENCY RESPONSE

EIRE

- ce of radioactive material will not influence the fire control processes and should not influence selection of techniques
- Move containers from fire area if you can do it without risk.
- Do not move damaged packages; move undamaged packages out of fire zone
- Dry chemical, CO₂, water spray or regular foam.
- Large Fire Water spray, log (flooding amounts).

SPILLION EFAK

- Do not touch damaged packages or spilled material.
- Damp surfaces on undamaged or slightly damaged packages are seldom an indication of packaging lailure. Contents are seldom liquid. Content is usually a metal capsule, easily seen if released from
- If source capsule is identified as being out of package, DO NOTTOUCH, Stay away and await advice from Radiation Authority.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves.
- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
 Use first aid treatment according to the nature of the injury.
- Do not delay care and transport of a seriously injured person.

 Persons exposed to special form sources are not likely to be contaminated with radioactive material.
- Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
- Injured persons contaminated by contact with released material are not a serious hazard to health care personnel, equipment or facilities.

RADIOACTIVE MATERIALS (Fissile/Low to High Level Radiation)

GUIDE 165

EIRE

Presence of radioactive material will not influence the fire control processes and should not influence selection of techniques,

Move containers from fire area if you can do it without risk.

EMERGENCY RESPONSE

- Do not move damaged packages; move undamaged packages out of fire zone
- · Dry chemical, CO2, water spray or regular foam. Large Fire

Water spray, fog (flooding amounts).

SPILL OR LEAK

- Do not touch damaged packages or spilled material.

 Damp surfaces on undamaged or slightly damaged packages are seldom an indication of packaging failure. Most packaging for liquid content have inner containers and/or inner absorbent materials Liquid Spill
- Package contents are seldom liquid. If any radioactive contamination resulting from a liquid release is present, it probably will be low-level.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves.
- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
- Use first aid treatment according to the nature of the injury. Do not delay care and transport of a seriously injured person.
- Give artificial respiration if victim is not breathing. Administer oxygen if breathing is difficult.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Injured persons contaminated by contact with released material are not a serious hazard to health care

RADIOACTIVE MATERIALS (FISSILE/LOW TO HIGH LEVEL RADIATION) GUIDE

POTENTIAL HAZARDS

HEALTH

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents. Packaging durability increases as potential radiation and criticality hazards of the
- Undamaged packages are safe. Contents of damaged packages may cause higher external radiation
- exposure, or both external and internal radiation exposure if contents are released.

 Type AF or IF packages, identified by package markings, do not contain life-threatening amounts of material.

 External radiation levels are flow and packages are designed, evaluated and tested to control releases and to prevent a fission chain reaction under severe transport conditions.
- Type B(U)F, B(M)F and CF packages (identified by markings on packages or shipping papers) contain potentially life-endangering amounts. Because of design, evaluation and testing of packages, fission chain reactions are prevented and releases are not expected to be life-endangering for all accidents except those of utmost severity.
- utnost severity. The rarely occurring "Special Arrangement" shipments may be of Type AF, BF or CF packages, Package type will be marked on packages, and shipment details will be on shipping papers. The transport index (TI) shown on labels or a shipping paper might not indicate the radiation level at one meter from a single, isolated, undamaged package, instead, if might relate to controls needed during transport because of the fissile properties of the materials. Alternatively, the fissile nature of the contents may be indicated by a criticality safety index (CSI) on a special FISSILE label or on the shipping paper. Some radioactive materials cannot be detected by commonly available instruments.

 Water from cargo fire control is not expected to cause pollution.

FIRE OR EXPLOSION

- These materials are seldom flammable. Packages are designed to withstand fires without damage to contents,
- Radioactivity does not change flammability or other properties of materials.
- Type AF, IF, B(U)F, B(M)F and CF packages are designed and evaluated to withstand total engulfment in flames at temperatures of 800°C (1475°F) for a period of 30 minutes.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for t
- measuring radiation levels.

 Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all directions. Stay upwind, uphill and/or upstream. Keep unauthorized personnel away. Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING Positive pressure self-contained breathing apparatus (SCBA) and structural firefighters' protective clothing will provide adequate protection against internal radiation exposure, but not external radiation exposure.

EVACUATION

- Large Spill

 Consider initial downwind evacuation for at least 100 meters (330 feet).
- Fire
- When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.

In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping document and/or the ERAP Program Section (page 391). ERC ZUNG

GUIDE 166

RADIOACTIVE MATERIALS - CORROSIVE (URANIUM HEXAFLUORIDE/WATER-SENSITIVE)

POTENTIAL HAZARDS

- Radiation presents minimal risk to transport workers, emergency response personnel and the public during transportation accidents, Packaging durability increases as potential radiation and criticality hazards of the content increase.
- Chemical hazard greatly exceeds radiation hazard.
- Substance reacts with water and water vapor in air to form toxic and corrosive hydrogen fluoride gas and an extremely irritating and corrosive, white-colored, water-soluble residue.

 If inhaled, may be fatal.

 Direct contact causes burns to skin, eyes, and respiratory tract.
- Low-level radioactive material; very low radiation hazard to people.
- Runoff from control of cargo fire may cause low-level pollution

FIRE OR EXPLOSION

- Substance does not burn. The material may react violently with fuels Product will decompose to produce toxic and/or corrosive furnes.
- Product will descriptose to produce that arrives contracte to the contract of the contract of
- are ussigned and evaluated to windstand severe continuous instructing total engoliment in haries at temperatures of 800°C (1475°F) for a period of 30 minutes. Bare filled cyfinders, identified with UN2978 as part of the marking (may also be marked H(U) or H(M)), may rupture in heal of enguling fire; bare empty (except for residue) cyfinders will not rupture in fires. Radioactivity does not change flammability or other properties of materials.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. Priorities for rescue, life-saving, first aid, fire control and other hazards are higher than the priority for measuring radiation levels.
- Radiation Authority must be notified of accident conditions. Radiation Authority is usually responsible for decisions about radiological consequences and closure of emergencies.
- As an immediate precautionary measure, isolate spill or leak area for at least 25 meters (75 feet) in all
- Stay upwind, uphill and/or upstream. . Keep unauthorized personnel away.
- Detain or isolate uninjured persons or equipment suspected to be contaminated; delay decontamination and cleanup until instructions are received from Radiation Authority.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA)
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See labba - mital salabarandi konesive/kalan asangg

Fire

When a large quantity of this material is involved in a major fire, consider an initial evacuation distance of 300 meters (1000 feet) in all directions.



In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product.
Please consult the shipping document and/or the ERAP Program Section (page 391).

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RADIOACTIVE MATERIALS - CORROSIVE (URANIUM HEXAFLUORIDE/WATER-SENSITIVE)

EMERGENCY RESPONSE

GUIDE 166

- DO NOT USE WATER OR FOAM ON MATERIAL ITSELF.
- Move containers from fire area if you can do it without risk. Small Fire

Dry chemical or CO.

Large Fire

- Water spray, log or regular foam.
 Cool containers with flooding quantities of water until well after fire is out.
- If this is impossible, withdraw from area and let fire burn.
- ALWAYS stay away from tanks engulled in fire.

SPILEORILEAK

- DO NOT GET WATER INSIDE CONTAINERS.
- Without fire or smoke, leak will be evident by visible and irritating vapors and residue forming at the point of release.
- Use fine water spray to reduce vapors; do not put water directly on point of material release from
- Residue buildup may self-seal small leaks.
 Dike far ahead of spill to collect runoff water

- FIRST AID!

 Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves.
- Call 911 or emergency medical service.
- Medical problems take priority over radiological concerns.
 Use first aid treatment according to the nature of the injury.
- In case of contact with Hydrofluoric acid (UN1790), flush with large amounts of water. For skin contact, if calcium gluconate gel is available, rinse 5 minutes, then apply gel. Otherwise, continue rinsing until medical treatment is available. For eyes, flush with water or a saline solution for 15 minutes.
- Do not delay care and transport of a seriously injured person. Give artificial respiration if victim is not breathing.

- Administer oxygen if breathing is difficult.
 In case of contact with substance, immediately flush skin or eyes with running water for at least
- Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed.
- · Keep victim calm and warm.

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GUIDE

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GUIDE 167

GUIDE CARBON MONOXIDE (REFRIGERATED LIQUID) 168

POTENTIAL HAZARDS

HEALTH

- TOXIC; Extremely Hazardous,
- Inhalation extremely dangerous; may be fatal.

 Contact with gas or liquefied gas may cause burns, severe injury and/or frostbite.
- Odorless, will not be detected by sense of smell.

FIRE OR EXPLOSION

- EXTREMELY FLAMMABLE.

 May be ignited by heat, sparks or flames.
- Flame may be invisible.
- Containers may explode when heated.
- Vapor explosion and poison hazard indoors, outdoors or in sewers.

 Vapors from liquefied gas are initially heavier than air and spread along ground.
- Vapors may travel to source of ignition and flash back.
- · Runoff may create fire or explosion hazard

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks),
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).

 Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural lirefighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.
- Always wear thermal protective clothing when handling refrigerated/cryogenic liquid

EVACUATION

Spill • See and in mina example out the resonation by the region.

 If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also. consider initial evacuation for 800 meters (1/2 mile) in all directions.

CARBON MONOXIDE (REFRIGERATED LIQUID) GUIDE

EMERGENCY RESPONSE

- DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED. Small Fire
- Dry chemical, CO₂ or water spray.
- Large Fire

 Water spray, fog or regular foam.
- . Move containers from fire area if you can do it without risk.
- Fire involving Tanks
- Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
 Cool containers with flooding quantities of water until well after fire is out.
- Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- · ALWAYS stay away from tanks engulled in fire.

SPILL OR LEAK

EIRE

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).

 All equipment used when handling the product must be grounded.
- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire.
- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled
- Do not direct water at spill or source of leak.
- If possible, turn leaking containers so that gas escapes rather than liquid.
 Prevent entry into waterways, sewers, basements or confined areas.
- Isolate area until gas has dispersed

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.

 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin or eyes with running water for at least
- In case of contact with liquefied gas, thaw frosted parts with lukewarm water.
- Keen victim calm and warm.
- Keep victim under observation
- · Effects of contact or inhalation may be delayed.

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ALUMINUM (MOLTEN) GUIDE

- Do Not Use Water, except in life-threatening situations and then only in a fine spray.
- Do not use halogenated extinguishing agents or foam.

 Move combustibles out of path of advancing pool if you can do so without risk.
- Extinguish fires started by molten material by using appropriate method for the burning material; keep water, halogenated extinguishing agents and foam away from the molten material.

EMERGENCY RESPONSE

SPILLORLEAK

- Do not touch or walk through spilled material.
- Do not attempt to stop leak, due to danger of explosion.

 Keep combustibles (wood, paper, oil, etc.) away from spilled material.
- Substance is very fluid, spreads quickly, and may splash. Do not try to stop it with shovels or other
- Dike far ahead of spill; use dry sand to contain the flow of material
- Where possible allow molten material to solidify naturally.
 Avoid contact even after material solidifies. Molten, heated and cold aluminum look alike; do not touch
- unless you know it is cold.
- Clean up under the supervision of an expert after material has solidified.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 For severe burns, immediate medical attention is required.
- Removal of solidified molten material from skin requires medical assistance. Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- · Keep victim calm and warm.

GUIDE ALUMINUM (MOLTEN) 169

POTENTIAL HAZARDS

EIRE OR EXPLOSION

- Substance is transported in molten form at a temperature above 705°C (1300°F).
- Violent reaction with water; contact may cause an explosion or may produce a flammable gas.
- Will ignite combustible materials (wood, paper, oil, debris, etc.).
- Contact with nitrates or other oxidizers may cause an explosion.

 Contact with containers or other materials, including cold, wet or dirty tools, may cause an explosion. · Contact with concrete will cause spalling and small pops.

- Contact causes severe burns to skin and eyes
- Fire may produce irritating and/or toxic ga

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all
- Stay powing, uphill and/or upstream.
- Keep unauthorized personnel away.
- Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).

 Wear flame-relardant structural firefighters protective clothing, including faceshield, helmet and gloves, as this will provide limited thermal protection.

GUIDE 170

METALS (POWDERS, DUSTS, SHAVINGS, BORINGS, TURNINGS, OR CUTTINGS, ETC.)

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- May react violently or explosively on contact with water.
- Some are transported in flammable liquids.

 May be ignited by friction, heat, sparks or flames.
- Some of these materials will burn with intense heat.
- Dusts or fumes may form explosive mixtures in air.
- Containers may explode when heated May re-ignite after fire is extinguished.

REALTH

- Oxides from metallic fires are a severe health hazard
- Inhalation or contact with substance or decomposition products may cause severe injury or death.
- Fire may produce irritating, corrosive and/or toxic gases.
 Runoff from fire control or dilution water may cause pollu

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids
- Stay upwind, uphill and/or upstream Keep unauthorized personnel away.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
 Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

Consider initial downwind evacuation for at least 50 meters (160 feet).

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.



METALS (POWDERS, DUSTS, SHAVINGS, BORINGS, TURNINGS, OR CUTTINGS, ETC.)

GUIDE 170

EMERGENCY RESPONSE

- DO NOT USE WATER, FOAM OR CO,.
- Dousing metallic fires with water will generate hydrogen gas, an extremely dangerous explosion hazard, particularly if fire is in a confined environment (i.e., building, cargo hold, etc.).
 Use DRY sand, graphite powder, dry sodium chloride-based extinguishers, G-1° or Met-L-X° powder. Confining and smothering metal fires is preferable rather than applying water.

- Move containers from fire area if you can do it without risk.
- Fire involving Tanks or Car/Trailer Loads

If impossible to extinguish, protect surroundings and allow fire to burn itself out.

SPILE OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Do not touch or walk through spilled material.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.

- FIRSTAID

 Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Keep victim calm and warm.

SUBSTANCES (LOW TO MODERATE HAZARD) GUIDE

EMERGENCY RESPONSE

FIRE

all Fire

- Dry chemical, CO2, water spray or regular foam.
- Large Fire
- Water soray, fog or regular foam.
- Do not scatter spilled material with high-pressure water streams.

 Move containers from fire area if you can do it without risk.
- Dike fire-control water for later disposal.
- Fire involving Tanks
- Cool containers with flooding quantities of water until well after fire is out.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
- ALWAYS slay away from tanks engulfed in fire.

SPILL OR LEAK

- Do not touch or walk through spilled material.
- Stop leak if you can do it without risk. Prevent dust cloud.
- · Avoid inhalation of asbestos dust.

Small Dry Spill

- · With clean shovel, place material into clean, dry container and cover loosely; move containers from spill Small Spill
- · Pick up with sand or other non-combustible absorbent material and place into containers for later disposa
- Large Spill
- Dike far ahead of liquid spill for later disposal.
- Cover powder spill with plastic sheet or tarp to minimize spreading.
- Prevent entry into waterways, sewers, basements or confined areas.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves
- Move victim to fresh air.
- Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- in case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

GUIDE Substances (Low to Moderate Hazard)

POTENTIAL HAZARDS

EIRE OR EXPLOSION

- Some may burn but none ignite readily
- · Containers may explode when heated
- Some may be transported hot.
- For UN3508, be aware of possible short circuiting as this product is transported in a charged state.

HEARTH

- Inhalation of material may be harmful.
- Contact may cause burns to skin and eyes
- Inhalation of Asbestos dust may have a damaging effect on the lungs.
- Fire may produce irritating, corrosive and/or toxic gases. Some liquids produce vapors that may cause dizziness or suffocation. Runoff from fire control may cause pollution.

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first, If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

 As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind, uphill and/or upstream

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- · Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

See Interest Initial Solution and Procedure Foliations and for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY".

If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

GUIDE GALLIUM AND MERCURY 172

POTENTIAL HAZARDS

- Inhalation of vapors or contact with substance will result in contamination and potential harmful effects.
- Fire will produce irritating, corrosive and/or toxic gases.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may react upon heating to produce corrosive and/or toxic fumes.
- Runoff may pollute waterways

PUBLIC SAFETY

- CALL EMERGENCY RESPONSE Telephone Number on Shipping Paper first. If Shipping Paper available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all Stay upwind, uphill and/or upstream
- Keep unauthorized personnel away

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill
 Consider initial downwind evacuation for at least 100 meters (330 feet).

Fire

When any large container is involved in a fire, consider initial evacuation for 500 meters (1/3 mile) in all directions.

EMERGENCY RESPONSE

EIRE

- Use extinguishing agent suitable for type of surrounding fire.
- Do not direct water at the heated metal.

SPILE OR LEAK

- Do not touch or walk through spilled material.

 Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Stop leak if you can do it without risk.
- Prevent entry into waterways, sewers, basements or confined areas.
- Do not use steel or aluminum tools or equipment.
- Cover with earth, sand or other non-combustible material followed with plastic sheet to minimize spreading or contact with rain
- For mercury, use a mercury spill kit.
- Mercury spill areas may be subsequently treated with calcium sulphide/calcium sulfide or with sodium thiosulphate/sodium thiosulfate wash to neutralize any residual mercury.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.
- Move victim to fresh air.
- Call 911 or emergency medical service.
 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least
- Keep victim calm and warm.

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Adsorbed Gases - Toxic* GUIDE

EMERGENCY RESPONSE

FIRE

- DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED.
- Dry chemical, CO₂, water spray or alcohol-resistant foam.
 For UN3515, UN3518, UN3520, use water only; no dry chemical, CO₂ or Halon®.

- Water spray, fog or alcohol-resistant foarn.
- Do not get water inside containers.
- Move containers from fire area if you can do it without risk.
- Damaged cylinders should be handled only by specialists

Fire involving Several Small Packages (rail or trailer) Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.

- Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulted in fire.

SPILL OR LEAK

- Some gases may be flammable. ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- For flammable gases, all equipment used when handling the product must be grounded.
- Fully encapsulating, vapor-protective clothing should be worn for spills and leaks with no fire. For oxidizing substances, keep combustibles (wood, paper, oil, elc.) away from spilled material.
- Do not touch or walk through spilled material. Stop leak if you can do it without risk.
- Do not direct water at soill or source of leak.
- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled
- Prevent entry into waterways, sewers, basements or confined areas.
- · Isolate area until gas has dispersed.

FIRST AID

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves
- Move victim to fresh air. . Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.

 Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim calm and warm.
- Keep victim under observation.
 Effects of contact or inhalation may be delayed. E2(E220)16

HEALTH

GUIDE ADSORBED GASES - TOXIC*

- TOXIC: may be fatal if inhaled or absorbed through skin.
- Vapors may be irritating.
- Contact with gas may cause burns and injury.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control may cause pollution.

FIRE OR EXPLOSION

Some gases may burn or be ignited by heat, sparks or flames but NOT readily due to low transportation pressures.

POTENTIAL HAZARDS

- May form explosive mixtures with air.
- Oxidizers may ignite combustibles (wood, paper, oil, clothing, etc.) but NOT readily due to low transportation pressures.
- Vapors may travel to source of ignition and flash back. Some of these materials may react violently with water.
- Cylinders exposed to fire may vent and release toxic and flammable gas through pressure relief devices.
- Runoff may create fire hazard.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all
- Keep unauthorized personnel away. Stay upwind, uphill and/or upstream.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks).
- Ventilate closed spaces before entering

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Wear chemical protective clothing that is specifically recommended by the manufacturer. It may provide little or no thermal protection.
- Structural firelighters' protective clothing provides limited protection in fire situations ONLY; it is not effective in spill situations where direct contact with the substance is possible.

EVACUATION

See process man assistance and voice by Action Stances.

- If several small packages (rail or trailer) are involved in a fire, ISOLATE for 1600 meters (1 mile) in all
 directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions. In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product, Please consult the shipping document and/or the ERAP Program Section (page 391).
- SOME SUBSTANCES MAY ALSO BE FLAMMABLE, CORROSIVE AND/OR OXIDIZING

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GUIDE ADSORBED GASES - FLAMMABLE OR OXIDIZING 174

POTENTIAL HAZARDS

- FIRE OR EXPLOSION Some gases will be ignited by heat, sparks or flames but NOT readily due to low transportation pressure. Substance does not burn but will support combustion.

- Vapors may travel to source of ignition and flash back.

 Cylinders exposed to fire may vent and release flammable gas through pressure relief devices.
- Containers may explode when exposed to prolonged direct flame impingement.

- Vapors may cause dizziness or asphyxiation without warning. Some may be irritating if inhaled at high concentrations.
- Contact with gas may cause burns and injury. Fire may produce irritating and/or toxic ga

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. As an immediate precautionary measure, isolate spill or leak area for at least 100 meters (330 feet) in all

- Keep unauthorized personnel away. Stay upwind, uphill and/or upstream.
- Many gases are heavier than air and will spread along ground and collect in low or confined areas (sewers, basements, tanks). Ventilate closed spaces before entering.

PROTECTIVE CLOTHING Wear positive pressure self-contained breathing apparatus (SCBA). Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

- Consider initial downwind evacuation for at least 800 meters (1/2 mile).
- - if several small packages (rail or trailer) are involved in a fire, ISOLATE for 1600 meters (1 mile) in all directions; also, consider initial evacuation for 1600 meters (1 mile) in all directions.

EMERGENCY RESPONSE

- DO NOT EXTINGUISH A LEAKING GAS FIRE UNLESS LEAK CAN BE STOPPED,
- Use extinguishing agent suitable for type of surrounding fire.
- Dry chemical or CO₂.
 Large Fire

- Water spray or fog.

 Move containers from fire area if you can do it without risk.

- Damaged cylinders should be handled only by specialists.
 Fire involving Several Small Packages (rail or trailer)
 Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
- Cool containers with flooding quantities of water until well after fire is out. Do not direct water at source of leak or safety devices.
- Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulied in fire.
- For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SPILL OR LEAK

- For flammable gases, ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.
- For oxidizing substances, keep combustibles (wood, paper, oil, etc.) away from spilled material. All equipment used when handling the product must be grounded.

 Do not touch or walk through spilled material.

 Stop leak if you can do it without risk.

- Use water spray to reduce vapors or divert vapor cloud drift. Avoid allowing water runoff to contact spilled material.
- Do not direct water at spill or source of leak.

 Prevent spreading of vapors through sewers, ventilation systems and confined areas.
- Ventilate the area
- Isolate area until gas has dispersed

- FIRST AID:

 Ensure that medical personnel are aware of the material(s) involved and take precautions to protect Ihemselves
- Move victim to fresh air.
- Call 911 or emergency medical service.

 Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
 Remove and isolate contaminated clothing and shoes.
- In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.
- Keep victim calm and warm.

INTRODUCTION TO GREEN TABLES - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

Table 1 - Initial Isolation and Protective Action Distances suggests distances useful to protect people from vapors resulting from spills involving dangerous goods that are considered toxic by inhalation (TIH) (PIH in the US). This list includes certain chemical warfare agents and materials that produce toxic gases upon contact with water. Table 1 provides first responders with initial guidance until technically qualified emergency response personnel are available.

The Initial Isolation Zone defines an area SURROUNDING the incident in which persons may be exposed to dangerous (upwind) and life-threatening (downwind) concentrations of material. The **Protective Action Zone** defines an area DOWNWIND from the incident in which persons may become incapacitated and unable to take protective action and/or incur serious or irreversible health effects. Table 1 provides specific guidance for small and large spills occurring day or night.

Adjusting distances for a specific incident involves many interdependent variables and should be made only by personnel technically qualified to make such adjustments. For this reason, no precise quidance can be provided in this document to aid in adjusting the table distances; however, general guidance follows.

Factors That May Change the Protective Action Distances

The orange-bordered guide for a material clearly indicates under the section EVACUATION -Fire, the evacuation distance required to protect against fragmentation hazard of a large container. If the material becomes involved in a FIRE, the toxic hazard may be less than the fire or explosion hazard. In these cases, the Fire hazard distance should be used.

Initial isolation and protective action distances in this guidebook are derived from historical data on transportation incidents and the use of statistical models. For worst-case scenarios involving the instantaneous release of the entire contents of a package (e.g., as a result of terrorism, sabotage or catastrophic accident) the distances may increase substantially. For such events, doubling of the initial isolation and protective action distances is appropriate in absence of other information.

If more than one tank car containing TIH materials involved in the incident is leaking, LARGE SPILL distances may need to be increased.

For a material with a protective action distance of 11.0+ km (7.0+ miles), the actual distance can be larger in certain atmospheric conditions. If the dangerous goods vapor plume is channeled in a valley or between many tall buildings, distances may be larger than shown in Table 1 due to less mixing of the plume with the atmosphere. Daytime spills in regions with known strong inversions or snow cover, or occurring near sunset, may require an increase of the protective action distance because airborne contaminants mix and disperse more slowly and may travel much farther downwind. In such cases, the nighttime protective action distance may be more appropriate. In addition, protective action distances may be larger for liquid spills when either the material or outdoor temperature exceeds 30°C (86°F).

NOTES

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Materials which react with water to produce large amounts of toxic gases are included in Table 1 - Initial Isolation and Protective Action Distances. Note that some water-reactive materials (WRM) which are also TIH (PIH in the US) (e.g., Bromine trifluoride (UN1746), Thionyl chloride (UN1836), etc.) produce additional TIH materials when spilled in water. For these materials, two entries are provided in Table 1 - Initial Isolation and Protective Action Distances (i.e., for spills on land and for spills in water). If it is not clear whether the spill is on land or in water, or in cases where the spill occurs both on land and in water, choose the larger Protective

Following Table 1, Table 2 – Water-Reactive Materials Which Produce Toxic Gases lists materials that produce large amounts of Toxic Inhalation Hazard gases (TIH) when spilled in water as well as the toxic gases that are produced when spilled in water

When a water-reactive TIH-producing material is spilled into a river or stream, the source of the toxic gas may move with the current and stretch from the spill point downstream for a substantial distance.

Finally, Table 3 lists Initial Isolation and Protective Action Distances for Toxic Inhalation Hazard materials that may be more commonly encountered.

The selected materials are:

- Ammonia, anhydrous (UN1005)
- Chlorine (UN1017)
- Ethylene oxide (UN1040)
- Hydrogen chloride, anhydrous (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- Hydrogen fluoride, anhydrous (UN1052)
- Sulfur dioxide/Sulphur dioxide (UN1079)

The materials are presented in alphabetical order and provide Initial Isolation and Protective Action Distances for large spills (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day time and night time situations and for different wind speeds,

PROTECTIVE ACTION DECISION FACTORS TO CONSIDER

The choice of protective actions for a given situation depends on a number of factors. For some cases, evacuation may be the best option; in others, sheltering in-place may be the best course. Sometimes, these two actions may be used in combination. In any emergency, officials need to quickly give the public instructions. The public will need continuing information and instructions while being evacuated or sheltered in-place.

Proper evaluation of the factors listed below will determine the effectiveness of evacuation or in-place protection (shelter in-place). The importance of these factors can vary with emergency conditions. In specific emergencies, other factors may need to be identified and considered as well. This list indicates what kind of information may be needed to make the initial decision.

The Dangerous Goods

- Degree of health hazard
- · Chemical and physical properties
- Amount involved
- · Containment/control of release
- Rate of vapor movement

The Population Threatened

- Location
- Number of people
- · Time available to evacuate or shelter in-place
- · Ability to control evacuation or shelter in-place
- Building types and availability
- Special institutions or populations, e.g., nursing homes, hospitals, prisons

Weather Conditions

- Effect on vapor and cloud movement
- · Potential for change
- Effect on evacuation or shelter in-place

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BACKGROUND ON TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

Initial Isolation and Protective Action Distances in this guidebook were determined for small and large spills occurring during day or night. The overall analysis was statistical in nature and utilized state-of-the-art emission rate and dispersion models; statistical release data from the U.S. DOT HMIS (Hazardous Materials Information System) database; meteorological observations from over 120 locations in United States, Canada and Mexico; and the most current toxicological exposure guidelines.

For each chemical, thousands of hypothetical releases were modeled to account for the statistical variation in both release amount and atmospheric conditions. Based on this statistical sample, the 90th percentile Protective Action Distance for each chemical and category was selected to appear in the Table. A brief description of the analysis is provided below. A detailed report outlining the methodology and data used in the generation of the Initial Isolation and Protective Action Distances may be obtained from the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration.

Hazardous Materials Sately Administration.

Release amounts and emission rates into the atmosphere were statistically modeled based on (1) data from the U.S. DOT HMIS database; (2) container types and sizes authorized for transport as specified in 49 CFR §172.101 and Part 173; (3) physical properties of the individual materials, and (4) atmospheric data from a historical database. The emission model calculated the release of vapor due to evaporation of pools on the ground, direct release of vapors from the container, or a combination of both, as would occur for liquefied gases which can flash to form both a vapor/aerosol mixture and an evaporating pool. In addition, the emission model also calculated the emission of toxic vapor by-products generated from spilling water-reactive materials in water. Spills that involve releases of approximately 208 liters for liquids (55 US gallons) and 300 kg for solids (660 lbs) or less are considered Small Spills, while spills that involve greater quantities are considered Large Spills. An exception to this is certain chemical warfare agents where Small Spills include releases up to 2 kg (4.4 lbs), and Large Spills include releases up to 25 kg (55 lbs). These agents are BZ, CX, GA, GB, GD, GF, HD, HL, HN1, HN2, HN3, L and VX.

Downwind dispersion of the vapor was estimated for each case modeled. Atmospheric parameters affecting the dispersion, and the emission rate, were selected in a statistical fashion from a database containing hourly meteorological data from 120 cities in the United States, Canada and Mexico. The dispersion calculation accounted for the time-dependent emission rate from the source as well as the density of the vapor plume (i.e., heavy gas effects). Since atmospheric mixing is less effective at dispersing vapor plumes during nighttime, day and night were separated in the analysis. In Table 1, "Day" refers to time periods after sunrise and before sunset, while "Night" includes all hours between sunset and sunrise.

Toxicological short-term exposure guidelines for the materials were applied to determine the downwind distance to which persons may become incapacitated and unable to take protective action or may incur serious health effects after a once-in-a-ilfetime, or rare, exposure, When available, toxicological exposure guidelines were chosen from AEGL-2 or ERPG-2 emergency response guidelines, with AEGL-2 values being the first choice. For materials that do not have AEGL-2 or ERPG-2 values, emergency response guidelines estimated from lethal concentration limits derived from animal studies were used, as recommended by an independent panel of toxicological experts from industry and academia.

PROTECTIVE ACTIONS

Protective Actions are those steps taken to preserve the health and safety of emergency responders and the public during an incident involving releases of dangerous goods. Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages) predicts the size of downwind areas which could be affected by a cloud of toxic gas. People in this area should be evacuated and/or sheltered in-place inside buildings.

Isolate Hazard Area and Deny Entry means to keep everybody away from the area if they are not directly involved in emergency response operations. Unprotected emergency responders should not be allowed to enter the isolation zone. This "isolation" task is done first to establish control over the area of operations. This is the first step for any protective actions that may follow. See Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages) for more detailed information on specific materials.

Evacuate means to move all people from a threatened area to a safer place. To perform an evacuation, there must be enough time for people to be warned, to get ready, and to leave an area. If there is enough time, evacuation is the best protective action. Begin evacuating people nearby and those outdoors in direct view of the scene. When additional help arrives, expand the area to be evacuated downwind and crosswind to at least the extent recommended in this guidebook. Even after people move to the distances recommended, they may not be completely safe from harm. They should not be permitted to congregate at such distances. Send evacuees to a definite place, by a specific route, far enough away so they will not have to be moved again if the wind bitte.

Shelter In-Place means people should seek shelter inside a building and remain inside until the danger passes. Sheltering in-place is used when evacuating the public would cause greater risk than staying where they are, or when an evacuation cannot be performed. Direct the people inside to close all doors and windows and to shut off all ventilating, heating and cooling systems. In-place protection (shelter in-place) may not be the best option if (a) the vapors are flammable; (b) if it will take a long time for the gas to clear the area; or (c) if buildings cannot be closed tightly. Vehicles can offer some protection for a short period if the windows are closed and the ventilating systems are shut off. Vehicles are not as effective as buildings for in-place protection.

It is vital to maintain communications with competent persons inside the building so that they are advised about changing conditions. Persons protected-in-place should be warned to stay far from windows because of the danger from glass and projected metal fragments in a fire and/or explosion.

Every dangerous goods incident is different. Each will have special problems and concerns. Action to protect the public must be selected carefully. These pages can help with initial decisions on how to protect the public. Officials must continue to gather information and monitor the situation until the threat is removed.

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HOW TO USE TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

- (1) The responder should already have:
 - Identified the material by its ID Number and Name; (if an ID Number cannot be found, use the Name of Material index in the blue-bordered pages to locate that number.)
 - Found the three-digit guide for that material in order to consult the emergency actions recommended iointly with this table:
 - Noted the wind direction.
- (2) Look in Table 1 (the green-bordered pages) for the ID Number and Name of the Material involved in the incident. Some ID Numbers have more than one shipping name listed - look for the specific name of the material. (If the shipping name is not known and Table 1 lists more than one name for the same ID Number, use the entry with the largest protective action distances.)
- (3) Determine if the incident involves a SMALL or LARGE spill and if DAY or NIGHT. A SMALL SPILL consists of a release of less than 208 liters (55 US gallons). This generally corresponds to a spill from a single small package (e.g. a drum), a small cylinder, or a small leak from a large package. A LARGE SPILL consists of a release of more than 208 liters (55 US gallons). This usually involves a spill from a large package, or multiple spills from many small packages. DAY is any time after sunrise and before sunset. NIGHT is any time between sunset and sunrise.
- (4) Look up the INITIAL ISOLATION DISTANCE. This distance defines the radius of a zone (Initial Isolation Zone) surrounding the spill in ALL DIRECTIONS. Within this zone, all public should be evacuated (protective clothing and respiratory protection is required in this zone). Persons should be directed to move out of the zone in a direction perpendicular to wind direction (crosswind), and away from the spill, to a minimum distance as prescribed by the Initial Isolation Distance.



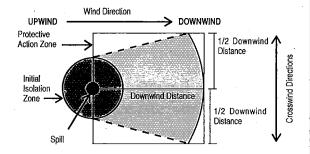
Initial Isolation Distance

(5) Look up the initial PROTECTIVE ACTION DISTANCE. For a given material, spill size, and whether day or night, Table 1 gives the downwind distance—in kilometers and miles—from the spill/leak source for which protective actions should be considered. For practical purposes, the Protective Action Zone (i.e., the area in which people are at risk of harmful exposure) is a square, whose length and width are the same as the downwind

distance shown in Table 1. Protective actions are those steps taken to preserve the health and safety of emergency responders and the public. People in this area should be evacuated and/or sheltered-in-place.

(6) Initiate Protective Actions to the extent possible, beginning with those closest to the spill site and working away from the site in the downwind direction. When a water-reactive TIH (PIH in the US) producing material is spilled into a river or stream, the source of the toxic gas may move with the current or stretch from the spill point downstream for a substantial distance.

The shape of the area in which protective actions should be taken (the Protective Action Zone) is shown in this figure. The spill is located at the center of the small circle. The larger circle represents the INITIAL ISOLATION zone around the spill.



NOTE 1: See "Introduction To Green Tables - Initial Isolation And Protective Action Distances" under "Factors That May Change the Protective Action Distances" (page 289)

NOTE 2: When a product in Table 1 has the mention "(when spilled in water)", refer to Table 2 – Water-Reactive Materials which Produce Toxic Gases for the list of gases produced when these materials are spilled in water.

Call the emergency response telephone number listed on the shipping paper or the appropriate response agency as soon as possible for additional information on the material, safety precautions and mitigation procedures.

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		(3.4 ml)	(1.2 ml)	(0.4 mi)	(H 9 m)	(1.9 ті)	(5,2 mi)	(7.0+ m)	(1.5 m)	(5.6 m)		(0.5m)	(6.9 ml)	(1.3 mi)	(0.7'm)	(0,4 m)	(0.5 m)	(1.1 ml)	
		5.4 km	19 km	0.7 km	3,1 Km	3.0 km	8.3 km	11.0+ km (7.9+ mi)	2.4 km	9.0 km		0.7.km	11.0 km	2.1 km	12 km	0.6 km	.0.8 km	1.7 kg	
	Refer to table 3	(1.3 mi)	(0.4 ml)	(0.2 ml)	(0.7 ml)	(0.8 mi)	(2.1 ml)	(4.7 mi)	(0.7 ml)	(1.9 ml)	Refer to table 3	(0.2 ml)	(3.8 mi)	(0.7 ml)	(0.5 mi)	(0.3 mi)	(0.3 ml)	(0.4 ml)	
	Refer	2,1 km	0,6 km	0.3 km	1,1 km	1.2 km	3,4 km	7,5 km	1.0 km	э.о кт	Refer t	шу вто	6.1 km	1.1 km	0,7 km	0.4 km	mx 2,0	0.5 km	
		(1250 ft)	(600 ft)	(500 ft)	(1) (e00 ft)	(1250 ft)	-(1500 ft)	(3000 ft)	(600 ft)	(1500 ft)		(200 ft)	(1500 ft)	(300 ft)	(200 ft)	(200 ft)	(200 ft)	(200 tt)	祖祖华等
		400 m	200 m	150 m	200 m	400 m	500 m	1000 m	200 m	ш 00 <u>9</u>		w 09	200 m	100 m	E0 m	ш 09	ш 09 ,	E0 m	
	0.4 km (0.3 ml)	0.4 km (0.3 ml)	0.2 km (0.1 ml)	.1 km (0.1 m)	.3 кт (0,2 т)	.4 km (0.3 ml)	1.0 km (0.6 ml)	.2 km (2.0 mj)	(0.1 ml) 0.7 km (0.4 ml)	.5 km (1.5 ml)	2.2 km (1.4 m)	0.1 km (0.1 ml)	3.4 km (2.1 m)	1.5 km (0.4 ml)	(0.1 mi) [0.3 km] [(0.2 mi)	12 km (0.1 ml)	0.2 km (0.1 m)	2 km (0.2 ml)	
AMPEKATS	(0.1 ml) 🖟	(0.1 m)	(0.1 ml) 🖺	(0.1 ml) 0.1 km	(0.1 ml) 0.3 km	(0.1 mi) 0.4 km	(0.2 mi)	(0.5 ml) 3.2 km	(0.1 ml) C	(0.4 ml) * 2.5 km	(0.4 ml) 2	(0.1 mi) Ĉ	(0.8 ml) 3	(0.2 mi) 0.5 km	(0.1 mi) E	(0.1 mi) 0.2 km	(0.1 m)	(0.1 mi) p 0.2 km	25
	0.1 km	0.1 km	0.1 km	0.1 km	0.1 km	0.1 km	0.2 km	0.8 km	0.2 km	0.6 km	0.7 km	0.1 km	1.3 km	0.2 km	0.2 km	0.1 km	0.1 km	0.1 km	
	(1001)	(1001)	(100 ft)	(100 ft)	(100 ft)	(1001)	(100 ft)	(500 ft)	(100 ft)	(300 ft)	(300 ft)	(100 ft)	(300 ft)	(100 ft)	(100 ft)	(100 ft)	(100 f)	(100 ft)	
	30 m	30 ш	30 m	30 m	30 m	30 m	30 m	150 m	30 m	100 m	100 m	30 m	100 m	30 m	30 #	30 m	30 m	93 E	
	Hydrogen fluoride, anhydrous	Hydrogen sulfide Hydrogen sulphide	Methylamine, anhydrous	Methyl bromide	Methyl mercaptan	Dinitragen tetroxide Nitragen dioxide	Nitrosyl chloride	CG (when used as a weapon)	DP (when used as a weapon)	Phosgene	Sulfur dioxide Sulphur dioxide	Refrigerant gas R-1113 Trifluorochloroethylene, stabilized	Acroleín, stabilized	Acrylonitrile, stabilized	Allyl alcehol	Ethylene chlorohydrin	Crotonaldehyde Crotonaldehyde, stabilized	Dimethyldichlorosilane (when spilled in water)	の 計画の可で ・ かくこの経過を
	125	117 117	118	123	117	124	125	125	125	125	125 125	119P	131P	131P	131	131	131P	551	
	1052	1053 1053	196	1062	1064	1067 1067	1069	1076	1076	1076	1079 1079	1082	1092	1093	1098	1135	143 143	1162	

			LA * TABLE	2	\$ 	N(0) N/0	and No	SOMETICS.	Minde Age	illicin el	radice i divingue isolacation andorazionista inventation are analysis	- 			
Page				(From a s	Small pack	SMALL SPILI kage or small feal	SPILLS all leak fr	SMALL SPILLS From a small package or small leak from a large package)	package)		m a large p	LARGE	LARGE SPILLS ckage or from many	LARGE SPILLS (From a large package or from many small packages)	9 3
296 -				Fi.	First ISOLATE In all Directions	80	T. PRO rsons Dov	Then PROTECT persons Downwind during	ring	ISO ISO	First ISOLATE	8	Th PROT	Then PROTECT persons Downwind during	
	₽ <u>8</u>	Guide	NAME OF MATERIAL	Meters	(Feet)	D, Kilomete	DAY Kilometers (Miles)	NIGHT Kilometers (1	NIGHT Slometers (Miles)	Meters	Meters (Feet)	I Kilomet	DAY Kilometers (Miles)	Kilometers (Miles)	3 S
	200 200 200 200 200 200 200 200 200 200	52 52	Ammonia, anhydrous Anhydrous ammonia	30 m	(100 ft)	0.1 km	(0.1 mi)	(0.1 ml) 0.2 km (0.1 m)	(0.1 m)			Refert	Refer to table 3		
	000 1008	125 125	Boron trifluoride Boron trifluoride, compressed	30 m	(100 ft)	0.1 km	(0.1 ml)	0.7 km	(0.4 ml)	400 m	(1250 ft)	2.2 km	(1.4 mi)	4.8 km (3.0 m)	
	1016 1016	119 119	Carbon monoxide Carbon monoxide, compressed	30 m	(100 ft)	0.1 km	(0.1 ml)	0.2 km	(0.1 mi)	200 m	(600 ft)	1.2 km	(0.7 mi)	4.4 km (2.8 m)	We i
٠.	1017	124	Chlorine	90 m	(200 ft)	0.3 km	(0.2 ml)	Ę	(0.7 ml)			Refer t	Refer to table 3		
	1026	119	Cyanogen	 	(100 ft)	0.1 km	(0.1 ml)	0.4 km	(0.3 mt)	m 09	(200 ft)	0.3 km	(0.2 mi)	11.1 km (0.7 m)	唇
	1040 1040	119P 119P	Ethylene oxide Ethylene oxide with Nitrogen	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 ml)			Refer t	Refer to table 3		
	1045 1045	124 124	Fluorine Fluorine, compressed	30 m	(1001)	0.1 km	(0.1 mi)		0.2 km (0.1 ml)	100 ш	(300 ft)	0.5 km	(0.3 ml)	2.2 km (1.4 m)	A-
	1048	125	Hydrogen bromide, anhydrous	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.2 mi)	150 m	(500 ft)	0.9 km	(0.6 ml)	2.6 km (1.6 m)	F
	1050	125	Hydrogen chloride, anhydrous	30 m	(100 fl)	0.1 km	(0.1 m))	(0.1 mi) (0.3 km	(0.2 ml)			Refer t	Refer to table 3		
. y	1051	117	AC (when used as a weapon)	m 09	(200 It)	0.3 km	(0.2 ml)	1.0 km	(0.6 ml)	1000 m	(3000 ft)	3,7 km	(2.3 ml)	8.4 km (5.3 ml)	
	1051	112	Hydrocyanic acid, aqueous solutions, with more than 20%					Au.							
NE.	1051	117	Hydrogen cyanide Hydrogen cyanide, anhydrous, ctabillzed	ш 09	(200 ft)	0.2 km	(0,2 mi)	(0.2 ml) 0.9 km (0.6 ml)	(0.6 m)	300 E	300 m (1000 ft)	1.1 FA	(0.7 ml)	24 km (1.5 m	
7	1051	117	Hydrogen cyanide, stabilized					1011							
								01.100.	1000-000						<u>.</u>
									100 AUT	-					

	Page	21916		[9-01						- 1 - 3 - 4	
	S y small packages)	Then PROTECT persons Downwind during		1.8 km (1.1.1 m)	0.5 km, (0.9 m)	2.0 km (1.2 m)	1.7 km (1.11 m)	5.6 km (3.5 m)	2.1 km (1.3 m)	5.6 km (3.5 m)	2.2 km (1.4 m)	2.1 km (1.3 m)	24 km (1,5 m)	2.6 km (1.6 m)	11.0+ (7.0+ 川)	2.0 km (1,3 m)	
	LARGE SPILL ckage or from man	PR(persons Do	DAY Kilometers (Miles)	1.0 km (0.6 mi)	0.3 km (0.2 mt)	0.6 km (0.4 mi)	0.9 km (0.6 mi)	1.9 km (1.2 ml)	1.1 km (0.7 ml)	3.0 km (1.9 mi)	0.7 km (0.5 mi)	1.3 km (0.8 ml)	0.8 km (0.5 ml)	1.5 km (0.9 ml)	11.0+ km (7.0+ mi)	0.6 km (0.4 mi)	
SELECTION OF	LARGE SPILLS (From a large package or from many small packages)	First ISOLATE In all Directions	Meters (Feet)	(300 fl)	m (200 ft)	m (200 ft)	(200 ft)	150 m (500 ft) 1	150 m (500 ft) 1	(10001)	60 m (200 ft) 0	100 m (300 ft) 1	(200 ft)	(2500 ft)	1000 m (3000 ft) 11	(200 ft)	
PABLE II NINTHALIBOLANDAN AND ARTOGENAL ACTION OF TOWNS A	arge package)		NIGHT Kilometers (Miles)	m (0.3 m) 100 m	m (0.1 m) 60	m (0.2 m) 60	m (0,3 m) 150 m	(0.4 m))	(0.4 m)	ரு (0.9 ரா) 300 ஈ	(0.2.m)	(0.4 mi)	rm (0.2 ml) 60 m	m (0.4 m) 800 m	(3:0 m)	.m. (0.2 m) 60 m	
मार्थाः वीकान्य	SMALL SPILLS From a small package or small leak from a large package)	Then PROTECT persons Downwind during	DAY Kiometers (Miles) Kilon	(0.1 m) 0.5 km	(0.1 ml) 0.1 km	(0.1 m) 0.2 km	1 (0.1 ml) 0.4-km	(0.1 mi) 0.7 km	(0.2 ті) 0.6 кт	. (0.3 ml) :1.4 km	n (0.1 ml) 0.3 km	ո (0.2 m) 0.6 km	n (0.1 ml) 0.3 km	ո (0.2 ml) 0.7 km	1 (0.9 ml) 4.9 km	(0.1 ml) 0.2 km (0.2 ml)	
	SMALL Package or s		_	(100 ft) 0.2 km	(100 ft) 0.1 km	(100 ft) 0.1 km	(100 ft) 0.2 km	(100 ft) 0.2 km	(100 ft) 0,2 km	(200 ft) 0.5 km	(100 ft) 0.1 km	(100 ft) 0.3 km	(100 ft) 0.1 km	(300 ft) 0.3 km	(300 ft) 1.4 km	(100 ft) 0.1 km	
i ixioi)	(From a sma	First ISOLATE in all Directions	Meters (Feet)	30 m (10	30 m (10	30 m (10	30 m (10	30 m (10	30 m (10	60 m (20	30 m (10	30 m (10	30 m (10	100 m (30	100 m (30	30 m (10	
			Guide NAME OF MATERIAL	1,1-Oimethylhydrazine 1 Dimethylhydrazine, unsymmetrical	5 Ethyl chloroformate	9 Ethyldichlorosilane (when spilled in water)	131P Ethyleneimine, stabilized	is Ethyltrichlorosilane (when spitled in water)	55 Methyl chloroformate	 Methyl chloromethyl ether 	 Metryldichlorositane (when spilled in water) 	11 Methylhydrazine	is Methyllrichlorosilane (when spilled in water)	131P Methyl vinyl ketone, stabilized	1 Nickel carbonyl	9 Trichlorosilane (when spilled in water)	
	Page	2987	ON No, Gui	1163 131	1182 155	1183 139	1185 13	1196 155	1238 15	1239 131	1242 139	1244 131	1250 155	1251 13	1259 131	1295 139	

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	L,	77	<u>`</u>	1						<u>art</u>	j vij	4	43		14.E
	(ju +	H m)	(0.4 m)	(O-III)	(5-1 m)	(0.7 m)	144	(1.0 m)	(0,4 ml)	(1.4 m)	(0.7 m)	(0.4 m)		(0.8 m)	MARKET
	11:0+ km (7:0+ ml)) <u>//</u>) w		BUR	BOUNDATION TO	等点 品质 机压									
	11.0	11:0+ km (7:0+ mi)	0.5 km	0.2 km	8. Ā	5		1.6 km	0.7.km	2.2 km	# 5	0.7 km		1.2 k	
	(7.0+ mi)	(5.8 mi)	(0.3 mi)	(0.1 mi)	(2,2 ml)	(0.3 m)		(0.4 mi)	(0.2 ml)	(0.4 m)	- 1	(0.3 ml)		(0.2 mi) 1.2 km	
											ı				
	11.0+ km	9.4 km	0.5 km	0.1 km	3.5 km	0.5 km		0.5 km	0.3 km	0.5 km	0.6 km	0.5 km		0.3 km	
	(3000 (1)	(3000 ft)	(200 ft)	(100 ft)	(1250 ft)	(H 00		(500 11)	(500 ft)	(300 ff)	(300 ft)	(200 ft)		(300 ft)	11 142
			1			100 m _ (300 ft)		150 m (5	1	- 1	- 1				
	1000 m	1000 m	E 09	30 m	400 m				150 m	001		ш 09	,	6 E	
	(3.2 m) 1.0+ km (7.0+ m)	(1.1 m) 6.2 km (3.5 m)	(0.1 ml) 0.2 km (0.3 ml)	0.1 km (0.1 m)	(1.7 m)	0.1 km		0,4 (m.)	(0.1 m)	(0.1 m) 0.5 km (0.4 m)	(0.2 ml) 0.3 km (0,2 ml)	(0.1 mi)	35 35	(0.1 ml) 0.2 km (0.1 ml)	
) wx +c	Ę	Ę	Ę	Ē	5		0.6 km	e F	Ē	ky.	0.2 km		Ę	I
	m) (E)	m) 6	- G		ال 2) o			1.5	6 E	ı
				(0.1 mi)	(0.5 r	(0.1 m)		(0,1 mi)	(0.1 mi)		- 1	(0.1 mi)			
	5,3 km	1.8 km	0.2 km	0.1 km	0.8 km (0.5 m) 2.7 km (1.7 m)	0.1 km		0.2 km	0.1 km	12	0.2 km	02 km		0.1 kg	100 100
	(2500 ft)	(1000 ft)	(100 ft)	(100 ft)	(300 ft)	(100 ft)		(zoo tt)	(1001)	(100 fb)	(100 ft)	(100 ft)		188 13	
	900 m	.) w 00E	30 m	30 ш (100 ш	30 m () m 09	30 H	908	- 1	ЭОШ (30 H	
			-	6)			r.				\top				ı
	CK (when used as a weapon)	Cyanogen chloride, stabilized			Compressed gas and hexaelryl letraphosphate mixture Hexaelryl tetraphosphate and compressed gas mixture	Hydrocyanic acid, aqueous solution, with not more than 20% Hydrogen cyanide Hydrogen cyanide Aydrogen cyanide, aqueous	solution, with not more than 20% Hydrogen cyanide	Hydrogen cyanide, stabilized (absorbed)	Ethylene dibromide and Methyl bromide mixture, ifquid Methyl bromide and Ethylene	liquid	Nutric oxide, compressed Perchloromethyl mercaplan	Phenylcarbylamine chloride	vater)	solid vater)	
	se pas	nloride,	fate phate	Ethylene dibromide	ompressed gas and hexa tetraphosphate mixture exaethyl tetraphosphate a compressed gas mixture	ydrocyanic acid, aqueor solution, with not more t 20% Hydrogen cyanide ydrogen cyanide, aqueo	solution, with not more of 20% Hydrogen cyanide	anide,	thylene dibromide and I bromide and I bromide mixture, liquid lethyl bromide and Ethy	dibromide mixture, liquid itric oxide	Nitric oxide, compressed	amine	otassium cyanide	Potassium cyanide, solid (when spilled in water)	Philipped Inchesion
	when u	ogen ch	Dimethyl sulfate Dimethyl sulphate	ane dib:	pressed aphospi ethyl te presse	ocyanic ition, wi b Hydro ogen cy	tion, wi 5 Hydro	ydrogen cy (absorbed)	ane dib nide mi	dibromide r	oxide, i	ylcarbyl	Potassium cyanide	sium c	P30111-
	CK (v	Cyan	Dime	Ethyl	Comp tetra Hexa com	Solt 20% Hydro	solt 20%	Hydrc (abs	Ethyk bror Methy	ag Sign	Perct	Phen	Potas	Potas (wh	
	125	125	156 156	154	123 123	154		152	ह ह	124	157	151	157	157	
	1589	1589	1595 1595	1605	1612	1613		1614	1647	991	1670	1672	1680	1680	Also is
200 March 1980	2.12			2							V 1			100	-

(1.2 m)

1.8 km

(0.4 m)

0.6 km

(200 fl)

69 E

(0.2 mi)

0.2 km

(0.1 m)

0.1 Fa

(100 ft) 8 8

Vinyltrichlorosilane, stabilized (when spilled in water)

155P 139

1.4 km (0.9 ml)

(0.3 ml)

0.5 km

(200 ft)

E 09

(0.1 ml)

0.2 km

(0.1 ml)

0.1 km

(100 ft)

Trimelhylchlorosilane (when spilled in water) Vinyltrichlorosilane (when spilled in water)

155P 135

1.3 km (0.8 m)

(0.2 mi)

0,3 km

(200 ft)

60 m

(0.1 m)

0.1 km (0.1 mi) 0.2 km

(100 ft)

Phosphorus pertrasulide, free from yelbow and while Phosphorus (when spilled in water) Phosphorus pentasulphide, free from yellow and while Phosphorus pentasulphide (when spilled in water)

33

(3.0 ml)

4.7 km

(1,002)

150 m

(1.2.m)

(0.4 ml) 119 km

0.5 km

2.2 km

(0.4 mi)

0.6 km

(200 ft)

m 09

(0.3 m.)

0.5 km

(0.1 ml)

0.2 km

(1001)

Sodum dithionite
(when spilled in water)
Sodium hydrosulfte
(when spilled in water)
Sodium hydrosulphile
(when spilled in water)

135

33

3.7 km (2.3 ml)

(0.7 mi) (1.3 ml)

1.0 km 2.0 km

300 m (1000 ft)

0.2 km (0.1 ml) 0.6 km (0.4 ml)

(100 ft) (200 fl)

89 89 60 m

Calcium phosphide (when spilled in water)

139

Pentaborane

35

135

(3.9 m)

6.2 km

0.8 km (0,5 m) 0.9 km (0.6 m)

जीवराव्हें जीव मान्य के उन्होंने के अधिक के अधिक मिन्

7.1 km (4.4 ml)

(1.2 mi) (1.2 ml)

2.0 km 1,8 km

(1200 ft) (1500 lt)

500 m 500 m

(0.2 ml) (0.1 mi)

0.2 km 0,2 km

(200 ft) (200 tt)

E 09 ۳ 99

Aluminum phosphide (when spilled in water)

139

139

phosphide (when spilled in water) Magnesium aluminum

	Il packages)	T od during	NIGHT Kilometers (Miles	4.0 km (2.5 m	0.7 km : (0.5 m	1.0 km = (0.7 m	0+ km 7.0+	(2.0 m) 4.2 km (2.6 m	1.6 km (1.0 m	1.4 km (0.9 m	3.4 km (2.1 m	3.6 km (2.2 m	266	m, 6,6 m	(1.1a		3.6 km	7
	LARGE SPILLS (From a large package or from many small packages)	Then PROTECT persons Downwind during	DAY Kllometers (Miles) Ki	(0.8 m) 4.	(0.3 ml) 0.	(0.2 ml) 1.	7.0+mil 11.0+km (7.0+r	(2.0 m) 4.	(1.0 m) [ii.	(0.6 m)	(1.1 mi)	(1.4 mi) 3		(m 5.1)	(0.2 m) (1.	-11-1-1	(1.4 mi) 3.	
47.	LARGE SPILLS Ickage or from many	l la	ZI Kilomete	1.3 km	0.4 km	0.3 km	11.0+ km		1.6 km	1.0 km	1.8 km	2.2 km	1 1	Z.1 XIII	0.4 km	ĺ	2,2 km	
STOWNS CANODINATED THE STORE OF STORE OF STORES OF STORE	n a large pe	First ISOLATE In all Directions	Meters (Feet)	(1000 ft)	(100 ft)	(300 tt)	(3000)	_	(10001)	(300 ft)	(500 ft)	(600 ft)	13 00 07	(10001)	(200 ft)		(600 ft)	
		ISO.	$\overline{}$	300 m	30 m	1001	1000 m	300 m	300 m	100 m	150 m	200 m		ur one	E 99		200 m	
	SMALL SPILLS From a small package or small leak from a large package)	uring	MIGHT (Miles)	(0.4 ml)	0.3 km (0.2 ml)	(0.1 m) 0.1 km (0.1 m)	(1.0 m) 4.3 km (2.7 m)	(0.8 mi) 2.0 km (1.3 mi)	0.4 km (0.3 m)	(0.2·mi)	(0.8 m)	(0.8 mi)	1	(u.i.in) Substitution (1000 II)	0.3 m)	42.	(0.8 ml)	± , , ,
ान होता ।	S from a larg	Then PROTECT persons Downwind during) 0.6 km		0.0	1.3 km	2.0 km	i) 0.4 km	i) 0.3 km	i) 1.2 km	i) 1.2 km)) ()) 2	o.	0.10 6.15 6.15		12 km	
	SMALL SPILLS kage or small leak fro	PR persons D	DAY Kilometers (Miles)	n (0.1 mi)	л (0.1 mi)		1			n (0.1 mi)	п (0.3 m)	m (0.3 mi)			л (0.1 m)	- 1	n (0.3 mi)	
Militarijos	SMAL backage or	2		ft) 0.2 km	ft) 0.2 km	ft) 0.1 km	ft) 1.6 km	ft) 1.3 km	ft) 0.4 km	ft) 0.2 km	ft) 0.4 km	ft) 0.5 km		ii vi	f) 0.1 km		ft) 0.5 km	
	om a small	First ISOLATE in all Directions	Meters (Feet)	30 m (100 ft)	30 m (100 ft)	30 m (100 ft)	300 m (1000 ft)	100 m (300 ft)	60 m (200 ft)	30 m (100 ft)	30 m (100 ft)	60 m (200 ft)		30 111 00 111	30 m (1001)		60 m (200 ft)	
)Fro	<u>.</u>	Z		8			1	-	30	36	09	8	3	· 8	\neg	_	-
			ATERIAL	odium phosphide when spilled in water)	hane	Acetone cyanohydrin, stabilized (when spiffed in water)	MD (when used as a weapon)	oarsine	PD (when used as a weapon)	ide orlde	9		and Methyl trure	de and mixture	and Methyl ture	mixture	Chloropicrin mixture, n.o.s.	
			Guide NAME OF MATERIAL	Sodium phosphide (when spilled in	Tetranltromethane	setone cyar when spiff	D (when us	Methyldichloroarsine	(when us	Arsenic chloride Arsenic trichloride	Вготовсеволе	Chloropicrin	Chloropicrin and Methyl bromide mixture	Methyl bromide and Chloropicrin mixture	Chloropicrin and Methyl chloride mixture Mathyl obloride and	Chloropicrin mixture	noropicrin r	
			Guide N	139 Sc)	143 Te	155 Ac	152 MI	152 Mr	152 PC	157 A:	131 Br	154 CF	123 T	123 Mc	£ £		154 C	
			₽ġ	1432	1510	1541	1556	1556	1556	1560 1560	1569	1580	1581	15B1	1582	2002	1583	
	(Lyp-	30 <u>0</u>							ţ.			1					-	
										 		T			**		- 143	https://p.
		na Mari	iles	É				<u></u>					Smi)	Qui,		i i		
	packages)	T d during	NIGHT (Miles)	(m, 0.9 m)	-	8 km (1.6 m)	5 km. (0.4 m)	2 km (0.8 m))	4 km (0.9 ml)	100	- 1	of states (U.b.m.l)	5km (1.6 m)	-km (-(1.5 m)	7 (d.f.)	4 km (0.3 m)		
	ILLS many small packages)	Then PROTECT Is Downwind during	Klom	14 (c)		2.6 km	0.6 km	1.2 km	1.4 km	1		10.9 Km	6 mi) 2.5 km (1.6 mi)	9 mi) 2.4 km (1.5 m)	1.7 d	0,4 km		
	RGE SPILLS ge or from many small packages)	Then PROTECT Persons Downwind during		(0.2 m) 1.4 km	36	(0,4 ml) 2,6 km	(0.3 mi) 0.6 km	(0.2 mi) 1.2 km	(0.2 ml) 1.4 km	10 P. G. O.	100 (100 m)	(U.Z.m.) - U.S.Km.	(0.6 mi)	(im 6:0)	(0.4 ml) 1,7 km	(0.1 m) 0,4 km		
	LARGE SPILLS arge package or from many small packages)	Then Then PROTECT Persons Downwind during	DAY Kilometers (Miles)	0.4 km (0.2 m) 1.4 km		0.5 km (0.4 ml) 2.6 km	0.4 km (0.3 mi) 0.6 km	0.3 km (0.2 mi) 1.2 km	0.3 km (0.2 ml) 1.4 km	10 June 14 0 and 15 graph and 10 s	(in 20)	U.S. KTD (U.S. ml) 近天 KTD (U.S. KTD) (U.S. KTD)	0.9 km (0.6 mi)	1.4 km (0.9 mi)	0.5 km (0.4 ml) 1,7,km	0.1 km (0.1 mi) 0.4 km		
ON DESTANCES	LARGE SPILLS (From a large package or from many small packages)	First Then I Then PROLATE PROTECT Persons Downwind during	DAY Kilometers (Miles)	(300 ft) 0.4 km (0.2 m) 1.4 km		(300 ft) 0.5 km (0,4 ml) 2.6 km	(100 ft) 0.4 km (0.3 mi) 0.6 km	(200 ft) 0.3 km (0.2 mi) 1.2 km	(200 ft) 0.3 km (0.2 ml) 1.4 km	MOOD WOOD NOT SEE	(mr.21) march (m.221)	(TOO II) U.4 KM (U.Z.M) POUS KM	(300 ft) 0.9 km (0.6 mi)	(1250 ft) 1.4 km (0.9 mi)	(200 ft) 0.5 km (0.4 mi) 117 km	(100 ft) 0.1 km (0.1 mi) 0.4 km		
AF ACTION DISTANCES		ء.	DAY Meters (Feet) Kilometers (Miles)	100 m (300 ft) 0.4 km (0.2 m) 1.4 km		100 m (300 ft) 0.5 km (0.4 ml) 2.6 km	30 m (100 ft) 0.4 km (0.3 mi) : 0.6 km;	60 m (200 ft) 0.3 km (0.2 m) 1.2 km	60 m (200 ft) 0.3 km (0.2 ml) 1.4 km	200 m 1400m 4 00m 14 0 m 3 cm	INDIAN TO STATE OF THE STATE OF	SO M (TUOTI) U.4 Km (U.2 ml) デリス Km So Min Son Min Min Min Min Min Min Min Min Min Mi	100 m (300 ft) 0.9 km (0.6 m))	400 m (1250 ft) 1.4 km (0.9 mi)	60 m (200 ft) 0.5 km (0.4 mi) 1/7 km	30 m (100 ft) 0.1 km (0.1 mi) 0.4 km		
KORTECHNE AC HON DISSANGER		ء.	DAY Meters (Feet) Kilometers (Miles)	100 m (300 ft) 0.4 km (0.2 m) 1.4 km		(300 ft) 0.5 km (0,4 ml) 2.6 km	(0,1 m) 30 m (100 ft) 0.4 km (0,3 mi) 0.6 km;	(0.1(m)) 60 m (200 ft) 0.3 km (0.2 m) 1.2 km	(0.2 m) 60 m (200 ft) 0.3 km (0.2 m) 1.4 km	70 E mil	AND CALL TO THE CALL	COLUMN COUM (100 II) U.4 KM (U.2 MI) PLUS KM	(0.2 m) 100 m (300 ft) 0.9 km (0.6 m)	(0.5.m). 400 m (1250 ft) 1.4 km (0.9 m)	(02.mi) 60 m (200 ft) 0.5 km (0.4 mi) 1.77 km	(031m) 30 m (100 ft) 0.1 km (0.1 mi) 0.4 km		
AND PROMEONIVE ACTION DISTANCIES IN IN		ء.	DAY Meters (Feet) Kilometers (Miles)	(0.1 m) 0.2 km (0.1 m) 100 m (300 ft) 0.4 km (0.2 m) 1.4 km		(0.3 ml) 100 m (300 ft) 0.5 km (0.4 ml) 2.6 km	0.2 km (0.1 ml) 30 m (100 ft) 0.4 km (0.3 ml) 0.6 km	60 m (200 ft) 0.3 km (0.2 m) 1.2 km	60 m (200 ft) 0.3 km (0.2 ml) 1.4 km	Moon non non non non non non non non non	The second secon	SO M (TUOTI) U.4 Km (U.2 ml) デリス Km So Min Son Min Min Min Min Min Min Min Min Min Mi	100 m (300 ft) 0.9 km (0.6 m))	400 m (1250 ft) 1.4 km (0.9 mi)	60 m (200 ft) 0.5 km (0.4 mi) 1/7 km	30 m (100 ft) 0.1 km (0.1 mi) 0.4 km	- 一手は一部では、一部では、一部では、一部では、一部では、一部では、一部では、一部では	
ALL THE PROPERTY OF THE PROPER		during	Miles) Meters (Feet) Kilometers (Miles)	0.1 km (0.1 m) 0.2 km = (0.1 m) 100 m (300 ft) 0.4 km (0.2 m) = 4 km		0.1 km (0.1 mi) 0.4 km (0.3 ml) 100 m (300 tt) 0.5 km (0.4 ml) 2.6 km	0.1 km (0.1 ml) 0.2 km (0.1 ml) 30 m (100 ft) 0.4 km (0.3 ml) 0.6 km	0.1 km (0.1 mi) 0.2 km (0.1 mi) 60 m (200 ft) 0.3 km (0.2 mi) 1.2 km	0.1 km (0.1 m) (0.3 km (0.2 m) 60 m (200 ft) 0.3 km (0.2 m) 1.4 km	100 mm 100 mm 100 mm 1000 mm 1000 mm 1000 mm 100 mm	The control of the co	・ I KAT (U.1 III) U.2 KITA (U.1 III) U.5 KIT (U.1 III) U.5 KIT (U.1 III) U.5 KIT (U.1 III) U.5 KITA (U.1 I	0.1 km (0.1 m) 0.3 km; (0.2 m) 100 m (300 ft) 0.5 km (0.6 m)	0.3 km (0.2 mi) 0.8 km (0.5 mi) 400 m (1250 ft) 1.4 km (0.9 mi)	0.1 km (0.1 m) (2.2 km (0.2 m)) 60 m (200 t) 0.5 km (0.4 m) 1/7 km	(031m) 30 m (100 ft) 0.1 km (0.1 mi) 0.4 km		
nina. Beaughdon and deandeanas ac non despandes		Then PROTECT persons Downwind during in.	DAY Kilometers (Miles) Kilometers (Miles) Kilometers (Miles)	(100 th) 0.1 km (0.1 ml) 0.2 km (0.1 ml) 100 m (300 th) 0.4 km (0.2 ml) 1.4 km		(100 tt) 0.1 km (0.1 ml) 0.4 km (0.3 ml) 100 m (300 tt) 0.5 km (0.4 ml) 2.6 km	(100 ft) 0.1 km (0.1 mi) 0.2 km (0.1 mi) 30 m (100 ft) 0.4 km (0.3 mi) 0.6 km	(100ft) 0.1 km (0.1 ml) 0.2 km (0.1 ml) 60 m (200ft) 0.3 km (0.2 ml) 1.2 km	(100 tt) 0.1 km (0.1 m) (0.3 km (0.2 m) 60 m (200 tt) 0.3 km (0.2 m) 1.4 km	CARCAN CO. Loss CO. Law A. C. C. Law C.	THE COLUMN TWO COLUMN TO COLUMN TWO COLUMN TO COLUMN TWO COLUMN T	(100 II) U. KM (U. I M) JU. KM (U. I M) OO M (100 II) U.4 KM (U.Z M) PU. KM (U.Z M) PU. KM (U. I M) PU. KM (U	(100 ft) 0.1 km (0.1 m) (0.3 km; (0.2 m) 100 m (300 ft) 0.9 km (0.6 m)	(300 t) 0.3 km (0.2 m) 0.8 km (0.5 m) 400 m (1250 ft) 1.4 km (0.9 m)	(1001) 0.1 km (0.1 m) 0.2 km (0.2 m) 60 m (2001) 0.5 km (0.4 m) 1/7/km	(100 ft) 0.1 km (0.1 ml) 0.1 km (0.1 ml) 30 m (100 ft) 0.1 km (0.1 ml) 0.4 km		
en inning. Bourgijen and Promeonie nas 20 non eistaan German	om a large package)	ء.	DAY Kilometers (Miles) Kilometers (Miles) Kilometers (Miles)	0.1 km (0.1 m) 0.2 km = (0.1 m) 100 m (300 ft) 0.4 km (0.2 m) = 4 km		30 m (100ft) 0.1 km (0.1 ml) 0.4 km (0.3 ml), 100 m (300ft) 0.5 km (0.4 ml) 2.6 km	30 m (100ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100ft) 0.4 km (0.3 m) 0.6 km	30 m (100 ft) 0.1 km (0.1 ml) 0.2 km (0.1 ml) 60 m (200 ft) 0.3 km (0.2 ml) 1.2 km	0.1 km (0.1 m) (0.3 km (0.2 m) 60 m (200 ft) 0.3 km (0.2 m) 1.4 km	On HARM Colon Internal Colon Internal Colon (1900)	THE COLUMN CALL THE COLUMN COLUMN COLUMN COLUMN CALL THE CALL THE CALL THE COLUMN CALL THE CAL	・ I KAT (U.1 III) U.2 KITA (U.1 III) U.5 KIT (U.1 III) U.5 KIT (U.1 III) U.5 KIT (U.1 III) U.5 KITA (U.1 I	0.1 km (0.1 m) 0.3 km; (0.2 m) 100 m (300 ft) 0.5 km (0.6 m)	0.3 km (0.2 mi) 0.8 km (0.5 mi) 400 m (1250 ft) 1.4 km (0.9 mi)	0.1 km (0.1 m) (2.2 km (0.2 m)) 60 m (200 t) 0.5 km (0.4 m) 1/7 km	30 m (100 ft) 0.1 km (0.1 m); 0.1 km; (0.1 m)) 30 m (100 ft) 0.1 km (0.1 m) 0.0 km		
SECONDES OF SECOND SECO		Then PROTECT persons Downwind during in.	DAY Kilometers (Miles) Kilometers (Miles) Kilometers (Miles)	let) 30m (100ft) 0.1 km (0.1 ml) 0.2 km (0.1 ml) 100m (300ft) 0.4 km (0.2 ml) 14 km		(100 tt) 0.1 km (0.1 ml) 0.4 km (0.3 ml) 100 m (300 tt) 0.5 km (0.4 ml) 2.6 km	30 m (100ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100ft) 0.4 km (0.3 m) 0.6 km	1 used as a weapon) 30 m (100 tt) 0.1 km (0.1 ml) 0.2 km (0.1 ml) 60 m (200 tt) 0.3 km (0.2 ml) 1.2 km	(100 tt) 0.1 km (0.1 m) (0.3 km (0.2 m) 60 m (200 tt) 0.3 km (0.2 m) 1.4 km	(1)	THE COLUMN CALL THE COLUMN COLUMN COLUMN COLUMN CALL THE CALL THE CALL THE COLUMN CALL THE CAL	(100 II) U. KM (U. I M) JU. KM (U. I M) OO M (100 II) U.4 KM (U.Z M) PU. KM (U.Z M) PU. KM (U. I M) PU. KM (U	(100 ft) 0.1 km (0.1 m) (0.3 km; (0.2 m) 100 m (300 ft) 0.9 km (0.6 m)	(300 t) 0.3 km (0.2 m) 0.8 km (0.5 m) 400 m (1250 ft) 1.4 km (0.9 m)	(1001) 0.1 km (0.1 m) 0.2 km (0.2 m) 60 m (2001) 0.5 km (0.4 m) 1/7/km	(100 ft) 0.1 km (0.1 ml) 0.1 km (0.1 ml) 30 m (100 ft) 0.1 km (0.1 ml) 0.4 km	おいていている。	

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Page 802

157 157

88 1589 1724 155

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1725

135 135

(2.2 mi)

(0.6 m) 1.4 km (0.9 ml)

(3.7 ml)

1,7 km (1.1 m)

11.0+ km (7.0+ mi) 11.0+ km "(7.0+ mi)

(0.8 m) 4.0 km (2.5 m) (0.3 ml) 0.7 km (0.5 ml) (0.2 ml) 1.0 km (0.7 ml)

Oylohewarylirchlorosiliane (when spilled in water) Oylohewarylirchlorosilane (when spilled in water) Oylohewarylirchlorosilane (when spilled in water) Obehotopherylirchlorosilane (when spilled in water) Obehotopherylirchlorosilane (when spilled in water) Obehotopherylirchlorosilane (when spilled in water) Obehotylirchlorosilane (when spilled in water) Horosulphronic add (when spilled in water) Horosulphronic add (when spilled in water) Howarderylirchlorosilane (when spilled in water) Howarderylirchlorosilane (when spilled in water) Norylirchlorosilane (when spilled in water) Howarderylirchlorosilane (when spilled in water) Cacadecylirchlorosilane (when spilled in water) Occadecylirchlorosilane (when spilled in water) Occadecylirchlorosilane (when spilled in water) Occadecylirchlorosilane (when spilled in water)
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(0.3 m) 1.7 km ((1.1 m)

3.8 km (2.4 ml)

(0.7 mi)

(300 ft) (300 ft) (300 ft)

100 m 100 m 100 m

(0.1 m) 0.5 km (0.3 m) (0.1 m) 0.3 km (0.2 m)

0.1 km 0.1 km 0.1 km

(100 ft)

93 E 30 m 30 m

(100 ft)

Boron trichloride (when spilled on land)

(0.3 m) 2.0 km (1.2 ml)

0.5 km 0.5 km 1.0 km 0.6 km

(200 ft) (200 ft)

E 09 E 09

(0.1 ml) 0.3 km (0.2 ml) (0.1 ml) 0.2 km (0.2 ml)

0.1 km

(100 H)

30 H 30 H

Aluminum chloride, anhydrous (when spilled in water)

(100 ft)

Amyltrichlorosilane (when spilled in water) Antimony pentafluoride (when spilled in water) (4.7 m)

7.5 km

(2.3 ml)

300 m (1000 ft) 3,7 km

0.8 km (0.5 m) 2.3 km (1.5 m)

(200 ft)

E 09

Bromine, solution Bromine, solution Bromine, solution (Inhalation Hazard Zone A)

(0.1 mi) 0.4 km (0.3 ml)

(100 f)

Boron trichloride (when spilled in water)

3.5 km (2.2 m)

1.3 km (0.8 m)

(0.4 mi)

10.2 km (6.4 m)

(3.1 mi) (0.7 mi) (0.2 mi)

400 m (1250 ft) 4.9 km

0.8 km (0.5 ml) 2.4 km (1.5 ml)

(200 ft)

60 m

Bromine pentafluoride (when spilled on land)

3.9 km (2.5 m) 0.5 km (0.3 m) (0.5 ml) 3.7 km (2.3 ml)

1.1 <u>P</u> 0.3 km

(300 ft)

100 m 30 m

(0.1 ml) (0.5 km) (0.4 ml)

(100 ft) 0.1 km

30 m 30 m

Bromine pentafluoride (when spilled in water)

0.5 km (0.3 m)

(0.2 ml)

0.3 km

(100 fl)

30 m

(0.1 ml) | 0.2 km (0.1 ml)

0.1 km

(100 ft)

30 30

Bromine, solution (Inhalation Hazard Zone B)

(0.3 m) 1.6 km (1.0 m)

100 m (300 ft) 1.0 km (200 ft) 0.5 km

30 m (100 ft) 0.1 km (0.1 ml) 0.5 km (0.3 ml)

Bromine trifluoride (when spilled in water) Butyltrichlorosilane (when spilled in water)

(100 ft)

0.1 km (0.1 ml) 0.2 km (0.1 ml)

(100 ft)

Bromine trifluoride (when spilled on land)

41 km (2.6 m)

(0.9 mi)

1.4 km

(1000 ft)

60 m 300 m

0.1 km (0.1 ml) 0.2 km (0.2 m)

30 m (100 ft) (200 ft)

60 m

Chlorine trifluoride

0.3 km (0.2 mi) 1.1 km (0.7 mi)

							SECULTURAL NO DE LA COMPANION			E01/0							1000
			From a s	S small pack	SMALL SPILLS kage or small leak fr	SPILLS all leak fr	SMALL SPILLS From a small package or small leak from a large package)	136)	(From a	l large pa	LARGE SPILLS ckage or from many	SPILLS om many 8	LARGE SPILLS (From a large package or from many small packages)	ÉTOC			
			ISOL ISOL	First ISOLATE	Deg.	T PRC Sons Dov	Then PROTECT persons Downwind during		First ISOLATE	TE	je d	Then PROTECT sons Downwind	Then PROTECT persons Downwind during	 300			ŀ
<u>e</u> §	Guid	Guide NAME OF MATERIAL	Meters (Feet)	(Feet)	DAY Kilometers	DAY Kilometers (Miles)	NIGHT Klometers (Miles)		Meters (Feet)	Feet)	,C Kilomete	DAY Kilometers (Miles)	NIGHT Klometers (Miles)	으용	- 1	Guide NA!	ا≅ا
180	156	Octyltrichlorosilane (when spilled in water)	30 H	(100 ft)	0.1 km	(0.1 mi)	0.2 km : (0.1 m)	↓	60 m (2	(200 ff)	0.5 km	(0.3 m)	(m.6.0) m/2.1	14 4	1752 1	156	홍혼
1804	35	Phenytrichlorosilane (when spitted in water)	30 ਜ	(100 ft)	0.1 km	(0.1 mi)	(0.1 mi) 0.2 km (0.1 mi)		30 m (1	(100 ft)	0.4 km	(0.3 ml)	1,4 km (0.9 m)	14	1752 1	156	통흥
1806	137	Phosphorus pentachloride (when spilled in water)	30 m	(100 ft)	0,1 km	(0,1 mi)	(0,1 mi) 0,2 km (0,2 mi)		30 m (1	(100 ft)	0,4 km	(0.3 ml)	1.4 km (0.9 mi)	4	1753 1	156 0	통혼
1808	137	Phosphorus tribromide (when spilled in water)	30 H	(100 ft)	0.1 km	(0.1 ml)	0.3 km (0.2 m)	l .	30 m (1	(1001)	0.4 km	(0.3 m)	1,3 km (0.9 ml)	 	1754 1:	137 C	용물
1809	137	Phosphorus trichloride (when apilled on land)	30 H	(100 ft)	0.2 km	(0.1 ml)	0.5 km (0.4 m)		100 m (3	(300 ft)	1.1 km	(0.7 ml)	2.2 km (1.4 ml)	14	1754	137 C	흰훓
1809	137	Phosphorus trichloride (when spilled in water)	30 ш	(100 ft)	0.1 kg	(0.1 川)	0.3 km (0.2 ml)	_	с) шоэ	(200 ft)	0.7 km	(0.5 ml)	2.3 km (1.4 ml)			ļ	₹ <u>₹</u>
1810	137	Phosphorus oxychloride (when spilled on land)	30 H	(100 ft)	0.3 km	(0.2 ml)	0.6 km (0.4 m)	_	100 m (3	(300 ft)	1.0 km	(0.6 ml)	1.8 km (1.1 m)	<u>-</u>	1754 1:	137	ᅙᅙ
1810	137	Phosphorus oxychloride (when spilled in water)	30 m	(1001)	0.1 km	(0.1 m)	(0.1 mi) 0.2 km (0.2 mi)		60 m (2	(200 ft)	0,6 km	(0.4 ml)	2.0 km (4.3 m)	2 قات	1754 1	137 C	호
1815	132	Propionyl chloride (when spilled in water)	30 m	(100 fl)	0.1 km	(0.1 ml)	(0.1 ml) 0.1 km (0.1 ml)		30 m (1	(1001)	0.3 km	(0.2 ml)	0.7 km (0.4 mi)				5 E
1816	55	Propylrichlorosilane (when spilled in water)	30 m	(100 f)	0.1 km	(0.1 ml)	(0.1 ml) 0.2 km (0,2 ml)		60 m (2	(200 ft)	0,6 km	(0.4 ml)	1.8 km (1.1 ml)	17	1758 1	137 C	\$ §
1818	157	Silicon tetrachloride (when spilled in water)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.3 km (0.2 m)		60 m (2	(200 ft)	0.8 km	(0.5 mi)	2.5 km (1.6 m)	 			≥
-						i			i				7 7 5 - 1				

Fig. 1 F	- IRT				S	SMALL'SPILLS	SPILLS		SMALLSPILLS			LARGE	LARGE SPILLS		
1782 156 Chioraeaetyl chloride 180 ATE				(From a s	mall pack	age or sm.	all leak fn	от a large	package)	(Fror	n a large p	ackage or 1	from many :	small packages)	
No. Cuide NAME OF MATERIAL Maters (Feel) Charactery (Miss) Charactery (Mis				ISOL ISOL	st ATE		PR	hen TECT		1081	irst LATE	i '	F.BG.	FECT	
No. Guide NAME OF MATERIAL Meters (Feet) Kilpmeters (Miles)	٥			n all Dir	ections	8 2	N V	DIN DUMUM	THI.	in all	irections	, a	ersons Dow	THOIN CHILD	THE STATE OF
1782 156 Chloroaceby chioride 30 m (100 ft) 0.3 km (0.2 m) 0.6 km (0.4 m) 100 m (300 ft) 1.1 km (0.7 m) 13 km (0.2 m) 1.1 km (0.7 m) 1.1	ş	Guide		Meters	(Feet)	Kilometer	rs (Miles)		rs (Miles)	Meters	(Feet)	Kilomet	ers (Miles)		les)
1752 156 Chooacetyl choices 30 m (100 ft) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.3 km (0.2 m) 0.5 km 1754 137 Choooyelytichocalism 30 m (100 ft) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.2 km 0.2 km 0.5 km 1754 137 Choooyellonic acid (with or without spilled in water) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.2 km (100 ft) 0.2 km (0.2 m) 0.3 km 1.2 km 0.2 km 0.2 km 0.2 km 0.2 km 0.2 km 0.3 km 0.2 km 0.2 km 0.3 km	1752	156	Chloroacetyl chloride (when spilled on land)		(1001)			0.6 km	(0.4 m)	100 m	(300 ft)	my L.	(0.7 ml)	1 - 1 - 1	E
1754 137 Chronohenylirichlosaliane 30 m (100 ft) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.3 km (0.2 m) 0.3 km 1754 137 Chronohenylirichlosaliane and (when spilled in water) 30 m (100 ft) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.3 km (0.2 m) 0.2 km (0.2 m) 0.3 km 1754 137 Chronohen spilled in water) 30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.2 m) 0.3 km (0.3 m) 0.3 km	1752	156	Chloroacetyl chloride (when spilled in water)	30 ₪	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(0.1 m)	30 m	(100 ft)	0.3 km	(0.2 mi)	35/26	FE.
137 Chicrosullone acid (with or without subjur incide matter) 30 m (100 ft) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) 0.3 km (0.2 m) 137 Chicrosullone acid (with or without subjur incide matter) 30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.2 m) 80 m (200 ft) 0.2 km (0.4 m) 2.2 km	1753	156	Chlorophenyltrichiorosilane (when spilled in water)		(100 ft)	0.1 km	(0.1 m)		(0.1 mi)	30 ш	(100 ft)	0.3 km	(0.2 mi)		Ê
137 Chicosullone actd (with or without set actd (with or without set actd (with or without set actd (with or without set) 30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.2 m) 60 m (200 ft) 0.7 km (0.4 m) 2.2 km (0.4 m) 2.2 km or without subjurt incide or without subjurt incided or without subjurt inci	1754	137	Chlorosullonic acid (with or without sulfur trioxide mixture) (when spilled on land)	30 ш	(100 ft)	0.1 km	(0.1 mi)	0.1 km	(C1 m)	30 ₪	(100 ft)	0.2 km	(0.2 ml)	-With Fall	E.
137 Chlorosuphonie acid (with or without suphur fraction and the suppur fraction of without suphur fraction and the suppur fraction of without suphur fraction and the suppur fraction of without suphur fraction and suppur fraction and suphur fraction and suphur fraction and suphur fraction and suphur fraction and suppur fract	1754	137	Chlorosullonic acid (with or without sulfur trioxide mixture) (when spilled in water)	30 m	(100 fl)	0.1 km	(0.1 mi)	0.3 km	(0.2 m))	60 m	(200 fl)	0.7 km	(0.4 ml)	2.2 km (1.4	E
137 Chlorosuptronic acid (with or whole splited in water) 137 Chronolum covabilities and (100 ft) 0.1 km (0.1 ml) 0.3 km (0.2 ml) 0.7 km (0.4 ml) 2.2 km water) 137 Chronolum covabilities 30 m (100 ft) 0.1 km (0.1 ml) 0.1 km (0.1 ml) 0.7 km (0.1 ml) 0.7 km (0.1 ml) 0.7 km	1754	137	Chlorosuphonic acid (with or without sulphur trioxide mixture) (when spilled on land)		(100 fl)	0.1 km	(0.1 mi)	0.1 km	(0°1 m)		(100 H)	0.2 km	(0.2 ml)	a characteristic	
137 Chromium oxychloride (100 ft) 0.1 km (0.1 ml) 0.1 km (0.1 ml) 0.2 km (0.1 ml) 0.2 km (0.1 ml) 0.2 km	1754	137	Chlorosulphonic acid (with or without sulphur trioxide mixture) (when spilled in water)			0.1 km	(0.1 ml)	0.3 km	(0.2 т.)	60 m	(200 ft)	0,7 km	(0.4 mi)	200 200 (24)	
	1758	137	Chromium oxychloride (when spilled in water)		(100 ff)	0.1 km	(0.1 ml)	0.1 Km	(0.1 m)	30 m	(100 ft)	0.2 km	(0.1 mi)		E
			-					*	1 10 10 10 10 10 10 10 10 10 10 10 10 10 1				•	(1977) 1777) 1777)	

	82	₩	=	1 5	2	嘉 第	₩ ₩	5	<u>∞</u> 9	6	ļě	₫	<u>∞</u>	8	1	₩	52	- [
7. V	¥ 10														7		J.	č01:	307	
														11,500	1.75				·	
		(12 m)	372		E.E.			10.2 km (6.3 ml)		2.6 km (1.5 m)	1() 1()	(1.5 m)		(1.2 mi)	T	el de	(6.3 т.)	\$.*. 		
		2.0 km			2.0 km			102 E		2.6 km		2.4 km		 			10.2.SM			
-		(0.4 mi)			(0.4 m)			(3.5 ml)		(0.8 mi)		(0.6 ml)		(0.5 mi)			(3.5 mi)			
	٠.	0.6 km			0,6 km			5.6 km		1.2 km		0.9 km		0.7 km			5.6 km			
		(200 ft)			(200 ft)			1.0 km (0.6 mi) 3.8 km (2.4 mi) 1000 m (3000 ft)		(# 009)		(500 ft)		(300 ft)		-	1000 m (3000 ft)			Shiring.
		ш 09			(EO III)			1000 m		200 m		150 m		100 m			1000 m			alle est
		(0.3m)			(0,3 mi)			(2.4 m)	0.05	(0.2 m)		(0.2 m)		(0.1 m)			(2.4 m)			sonicio en la terra de la compania del compania de la compania de la compania del compania de la compania del compania de la compania de la compania de la compania de la compania del compania de la compania de la compania de la compania del compania de
		0.1 km (0.1 mi) 0.5 km (0,3 mi)			0.5 km (0.3 mi)			3.8 km	a ca	0.4 km (0.2 m)		0.3 km (0.2 m)		0.2 KT			(0.6 mi) 3.8 km			n e a e a
		(0.1 mi)			(0,1 m)			(0.6 ті)		(0.1 m)		(0.1 m)		(0.1 ml)						in delenia
					0.1 km			1.0 km		0.1 km		0.1 Fă		0.1 km	_		1.0 km			
		(100 ft)			(100 ft)			150 m (500 ft)		(100 ft)		(100 #)		(100 ft)			(200 ft)			OBSEC
		30 H			, E			150 m		80 E		30 m		98 E			150 m			
	Potassium dithionite (when spilled in water)	Potassium hydrosulfite (when soilled in water)	Potassium hydrosulphite (when spilled in water)	Zho dithlonte	Zinc hydrosulfite	(when spilled in water) Zinc hydrosulphite (when spilled in water)	Compressed gas, polsonous,	Compressed gas, poisonous,	flammable, n.o.s. (Inhalalion Hazard Zone A)	Compressed gas, poisonous, fammable, n.o.s.	(Inhalation Hazard Zone B)	Compressed gas, poisonous, llammable, n.o.s.	(Inhalation Hazard Zone C)	Compressed gas, poisonous, flammable, n.o.s.	(Inhalation Hazard Zone D)	Compressed gas, toxic, flammable, n.o.s.	Compressed gas, toxic,	Itammaole, n.o.s. (Inhalation Hazard Zone A)	če.	(語) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1
	135	135	135	171	17	Ē	119	119		119		119		119		119	119			
	1929	1929	1929	1931	1931	1931	1953	1953	الساد	1953		1953		1953		1953	1953			

							Sæ						an ang Tabung		
	(0.3 ml)	(0.7 ml)	(0.3 ml)	(E)	(3.6ml)		(3.6 m)		(1.0 m)	(1.0 m)	(1.0 m)	(1.0 m)	(m 6.0)		
090.000	0.4 km	021	0.4 km	1.1 km (0.7 m)	5.7 km	7-130	57년 -		1.5 km	 	1.5 km		(m 6.0)		
	(0.2 ml)	(0.2 m))	(0.2 mi)	(0.2 mi)	(1.8 mi)		(1.8 ml)		(0.5 mi)	(0.3 ml)	(0.5 ті)	(0.3 mi)	(0.5 mi)	! ;	
	0,3 km	0.3 km	0.3 km	0.3 km	2.9 km		2.9 km		0.8 km	0.5 km	0.8 km	0.5 km	0.7 km		
	(200 ft)	(1001)	(200 fl)	(100 ft)	(1000 ft)		300 m (1000 ft)		(200 ft)	(200 li)	(200 ft)	(200 ft)	(200 ft)		
	ш 09	30 m	m 09	30 m	300 m		300 m		ш 09	ш 09	ш 09	e0 m	m 09		्रांक लोगानी
	0.1 km (0.1 ml)	0.2 km (0.1 m)	0.14m (0.1m)	2 km (0:1 m)	(0.2 mi) 1.0 km (0,6 mi)		(0.2 ml) 1.0 km (0.6 ml)		4 km (0.3 ml)	(0.1 ml) 0.2 km (0.1 ml)	0.4 km (0.3 mi)	0.2 km (0.1 ml)	0.6 km (0.4 m)		Highly e species of continuing in a particular species of some
ASE	(0.1 ml)	(0.1 ml)	(0,1 m)	(0,1 m) 0,2 km	(0.2 mi) 1		(0.2 ml) 1		(0.1 ml) 0.4 km	(0.1 ml) 0	(0.1 ml) 0	(0.1 m) 0	(0.2 m)		शाम शिक्का
	0.1 km	0.1 km	0.1 km	0.1 km	0.4 km		0.4 km		0.2 km	0.1 km	0.2 кт	0.1 km	0,2 km		-0- -0-
	(100 ft)	(100 ft)	(100 ft)	(100 ft)	(200 ft)		(200 ft)		(100 ft)	(100 ft)	(100 ft)	(100 ft)	(100 ft)		10000
	30 ш	30 m	30 m	ш06	ш 09		m 09		30 m	30 ш	ш08	30 m	30 m		Spisson
	Sulfur chlorides (when spilled on land)	Sulfur chlorides (when spilled in water)	Sulphur chlorides (when spilled on land)	Sulphur chlorides (when spilled in water)	Sulfur trioxide, stabilized Sulphur trioxide, stabilized	Sulfuric acid, fuming Sulfuric acid, fuming, with not less than 30% free	Sulfur trioxide Sulphuric acid, fuming Sulphuric acid, fuming, with not less than 30%, free	Sulphur trioxide	Sulfuryl chloride (when spilled on land)	Sulfuryl chloride (when spilled in water)	Sulphuryl chforide (when spilled on land)	Sulphuryl chtoride (when spilled in water)	Thionyl chloride (when spilled on land)		
	137	137	137	137	137 137	137	137		137	137	137	137	137		
	1828	1828	1828	1828	1829 1829	<u> </u>	<u>8</u> 8		1834	1834	1834	1834	1836		
											5		Pagg	≥30V.	
								7			و و الحواد	Tes	ale de Su-	er janear	
		2 [E		Ē		€		.6 m)	, i		2 mi)	NZ.	Ê .		

	P.gc	EAS:		7.27			i i nema				
	2.25	34-1 de								- Vigital	
	(S)		IT (Miles)	(1.6.m)	(1.5 m)	(1.2 ml)	(6.3 ml)	(2.5 ml)	(1.5 ml)	(1.2·m)	
	I packag	T d during	NIGHT Klometers (Miles)	2.6 km		(1.9 km) (1.2 ml)	10.2 km (6.3 ml)	4.1 km (2.5 ml)	2.4 M	- E	
7.00 p.=	S. Iy sma	Then PROTECT S Downwind	10.00		(0.6 ml) 2.4 km			-			
	SPILL from mar	Then PROTECT Dersons Downwind during	DAY Kilometers (Miles)	(0.8 mi)	(0.6 mi	(0.5 ml)	(3.5 ml)	(im 6:0)	(0,6 ml)	(0.5 ml)	
9.	LARGE SPILLS ackage or from many	٥	Kilome	1.2 km	0.9 km	0.7 km	5,6 km	<u>‡</u>	0.9 km	0.7 km	
SEPANKALE I	LARGE SPILLS From a large package or from many small packages)	First ISOLATE	(Feet)	(600 ft)	(200 ft)	(300 ft)	(1,6 mi) 1000 m (3000 fl)	(1000 ff)	(200 (1)	(300 ft)	
	(Fro	ISO Olis	Meters	200 m	150 ш	100 m	1000 т	300 m	150 ш	100 ш	
	package)	E .	HT S (Miles)		(0,2 mi)	(0.1 mi)	(1,6 m)	(0.5 m)	(0.2 m)	(0.1 m)	
	SMALL SPILLS From a small package or small leak from a large package)	Then PROTECT persons Downwind during	NIGHT Kilometers (Miles)	(0.1 ml) 0.4 km (0.2 mi)	0.3 m	0.2 km (0.1 m)	2.5 km	₽ 80	0.3 km	(0.1 mi) 0.2 km = (0.1 mi)	
(A)(A)	SPILLS all leak fro	Th PRO Sons Dow	DAY Kilometers (Miles)	(0.1 mi)	(0.1 ml)	(0.1 ml)		(0.1 mi)	(0.1 mi)	(0.1 mi)	
	SMALL SPILLS kage or small leak fr	2	DAY Kilometers	0.1 km	0.1 참	0.1 km	0.5 кт (0.3 ті)	0.2 kg	9.1 km	0.1 km	
	Small pack	First ISOLATE	(Feet)	(100 ft)	(100 ft)	(100 ft)	100 m (300 ft)	(100 ft)	(100 ft)	(100 ft)	
	(From a	ISOI ISOI	Meters	. E.	E 08	30 ш	100 m	88 #	30 m	30 m	
			Guide NAME OF MATERIAL	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)	Compressed gas, toxic, fammable, n.o.s. (Inhalation Hazard Zone C)	Compressed gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)	Compressed gas, poisornous, n.o.s. Compressed gas, poisornous, n.o.s. poisornous, n.o.s. (Inhalation Hazard Zone A)	Compressed gas, polsonous, n.o.s. (Inhalation Hazard Zone B)	Compressed gas, polsonous, n.o.s. (Inhalation Hazard Zone C)	Compressed gas, poisonous, n.o.s. (Inhalation Hazard Zone D)	
			Guide	19	₽	119	123	52	\$	123	
			Ωġ	1953	1953	1953	1955 1955	1955	1955	1955	

									7		· 👼		
	(sabs)	jut	NIGHT Kilometers (Miles)	11.0+ km (7.0+ m)	0.2 km (0.1 mi)	1.6 km (1.0 mi)	(0.3 m) 1,8 km (1,1 m)	11:0+ km (7:0+ ml)	(3.9 ml)	(0.7 m)	(2.5 ml)	(1.4 m)	
	small pac	FECT Priving du		11.0+kr	0.2 km	1.6 km	R	11.0+ kr	6.3 km	1.0 km	4.0 km	22 F	(
SPILLS	from many	Then PROTECT persons Downwind during	DAY Kilometers (Miles)	(4.9 ml)	(0.1 mi)	(0.3 ml)	(0.3 ml)	(6.5 ml)	(2.9 mi)	(0.3 m)	(0.8 mi)	(0.4 ті)	
LARGE SPILI	(From a large package or from many small packages)	ă	Kilomet	7.9 km	0.1 km	0.5 km	0.5 km	10.4 km	4.6 кт	0.4 km	1.3 km	0.6 km	
SMALL Split.	m a large r	First ISOLATE In all Directions	Meters (Feet)	(2000 #)	(100 ft)	(200 ft)	(300 ft)	(3000 ft)	(1250 ft)	(100 ft)	(600 ft)	(200 ft)	
Ĺ		SI on a	Meter	e00 m	30 m	m 09	100 m	1000 m	400 m	90 E	200 m	ш 09	
	From a small package or small leak from a large package)	ring	DAY Kllometers (Miles) Kilometers (Miles)	(1,5 m)	(0,1 m)	0.1 m	(0.5m)	2.9 km (1,8 ml)	(1.3 m0	(0.2 m)	(0.6 ml)	(0.4 ml)	10 55 5 10 55 5 10 5 5 5
	л a large	Then PROTECT PERSON Downwind during	NIGH Kilometers	(0.6 m) 2.4 km	0.1 km	0.2 km (0.1 m)	(0.1 mi) 0.7 km (0.5 mi)	2.9 km	2.1 km	(0.1 ml) 0.2 km	1.0 km (0.6 ml)	(0.1 m) 0.5 km (0.4 m)	
SPILLS	all leak fr	T PRO rsons Dov	DAY ters (Miles)	(0.6 mi)	(0.1 m)	(0.1 ml)	(0.1 mi)	(1.2 mt)	(im 6:0)	(0.1 ml)	(0.2 ml)	(0.1 ml)	
SMALL	age or sm	D	Kilomete	0.9 km	0.1 km	0.1 km	0.2 km	2.0 km	1.4 km	0.1 km	0.3 km	0.2 кт	
	Small pack	First ISOLATE in all Directions	(Feet)	(300 ft)	(100 ft)	(100 ft)	(100 ft)	(500 ft)	(200 ft)	(100 ft)	· (200 ft)	(100 ft)	
į	E MOL	. ISO	Meters	100 m	30 m	98 E	30 ш	150 m	150 m	30 m	ш 09	. w	
			Guide NAME OF MATERIAL	Thionyl chloride (when spilled in water)	(when spilled on land)	Tianlum tetrachloride (when spilled in water)	Silicon tetrafluoride Silicon tetrafluoride, compressed	ED (when used as a weapon)	Ethyldichloroarsine	Acetyl iodide (when spilled in water)	Diborane Diborane, compressed Diborane mixtures	Catclum dithionite (when spilled in water) Calclum hydrosulfite (when spilled in water) Calclum hydrosulphite (when spilled in water)	
			Guide	137	137	137	125	151	151	156	119 1 119 1	135	
			<u>e</u> §	1836	£38	龗	1859 1859	1892	1892	1898	191 191 191	1923 1923 1923	

						7			i je sti								
	Ut.	(F	î:	(n	3	E								.)	<u> </u>	<u> </u>	
	(# 8 m)	(7.0+m)	(1.8 mi)	(1,5 mi)	(1.8 m)	(2.4 ml)	(7.0+	(2.0 m))	(0.7 m	0.6 km (0.4 ml)		(18m)		(in.6.m)	(0.2 mi)	(0.6 mi)	
	7.8 km	11.0+ km	2.8 km	2.4 km	2.9 km	3.8 km	/1.0+ km (7.0+ ml)	3.2 km	1.1 km (0.7 m)	0.6 km	#E-1464.20	2.8 M		2.5 km	0.4 km	. 0.9 km	
	(2.1 mi)	(7.0+ mi)	(0.6 ml)	(0.6 ml)	(0.5 ml)	(0.8 ml)	(7.0+ mi)	(0.8 mi)	(0.4 mi)	(0.3 m))		(0.6 ml)		(im 6:0)	(0.2 ml)	(0.2 mi)	ووالا
	3.4 km	11.0+ km	0.9 km	0.9 km	0.8 km	1.3 km	11.0+ km	1.3 km	0.6 km	0.4 km		1.0 km		1.4 km	0.3 km	0.3 km	
	(2000 ft)	(3000 ft)	(200 ft)	(500 ft)	(500 ft)	(1000 ft)	(3000 ft)	(10001)	(200 ff)	(100 ft)		(1000 ft)		(500 ft)	(100 ft)	(1001)	
	m 009	1000 m	150 m	150 m	150 m	₩ 008.	10001	300 m	ш 09	30 m		300 m		150 m	30 ш	30 m	
	(2:1 m)	(5.4 mi)	(0.5 mi)	(0.2 ml)	∥- (0.5 ml)	(0.6 mі)	(3.7 ш)	(0.2 m)	(0.2 mi)	(0,1 m)		(0.3 m)		(0,3 mi)	(0.1 mi)	(0,1 m)	Ť j
	(0.7 mi) 3.4 km	8.6 km	0.7 km	(0.1 ml) 0.3 km (0.2 ml)	0.8 km	1.0 km (0.6 m)	(1.1 m.) 5.9 km	0.3 km	(0.1 ml) 0.3 km (0.2 ml)	(0.1 ml) 0.2 km (0.1 ml)		(0.1 mi) 0.4 km		0.5 km	0.1 km		
	(0.7 mi)	(2.2 mi)	(0.1 mi)	(0.1 ml)	(0.1 ml)	(0.2 mi)	(1.1 mi)	(0.1 mi)	(0.1 mi)	(0.1 mi)		(0.1 ml)		(0.1 mi)	(0.1 ml)	(0.1 mi)	
	1.1 kg	3.6 km	0.2 km	0.1 km	0.2 km	0.2 km	1.7 km	0.1 km	0.2 km	0.1 km		0.1 km		0.2 km	0.1 km	0.1 km	
	(600 ft)	(2000 ft)	(100 ft)	(100 ft)	(100 lt)	(200 ft)	(1000 f)	(100 ft)	(100 ft)	(100 ft)		(100 ft):		(100 ft)	(100 ft)	(100 ft)	
	200 m	m 009	30 m	30 m	30 H	E0 m	300 m	30 ₪	30 т	.ш оє		30 m		30 m	30 m	30 m	
	Selenium hexafluoride	Tellurium hexafluoride	Tungsten hexafluoride	Hydrogen iodide, anhydrous	Phosphorus pentafluoride Phosphorus pentafluoride, compressed	Phosphine	Hydrogen selenide, anhydrous	Carbonyl suffide Carbonyl sufphide	Chloroacetaldehyde 2-Chloroethanal	socyanatobenzotrifluorides	Nitrosylsulfuric acid, liquid (when spilled in water) Nitrosylsulfuric acid, solid	(when spilled in water) Nitrosyisulphuric acid, liquid (when spilled in water)	Nitrosytsulphuric acid, solid (when spilled in water)	Allylamine	Phenyl mercaptan	Butyryl chloride (when spilled in water)	
	125	125	125	125	22 22 23	119	117	£ £	द्ध ह	136	157	157	157	5	131	132	
· • -	2194	2195	2196	2197	2198 2198	2199	2202	888 888 888	2232	2885	2308	2308	2308	2334	2337	2353	

2.2 km ((.4 mi)

(0.4 mi)

0.5 km

(300 ft)

100 m

(0,4 m.)

0.5 km (0.1 ml)

0,1 km

(100 ft)

Dinitiogen letroxide and Nitric oxide and Introduction oxide and Dinitiogen letroxide mixture Nitric oxide and Nitriogen disclaration. Which oxide and Nitrogen letroxide and Nitriogen letroxide mixture Nitriogen disclaration oxide mixture Nitriogen letroxide mixture Nitriogen etworkide and Nitrio oxide mixture Nitriogen letroxide and Nitrio oxide mixture oxide mixture oxide mixture oxide mixture

₩ 9.6

(2.7 ml)

4.4 km

(1500 ft)

500 m

(0.7 ml) 3.4 km (2.1ml)

1.0 km

(300 fl) 100 E

n.o.s. Insecticitie gas, toxic, n.o.s. Parathion and compressed gas mixture

22 23

124

124 124 124 124

1975 1975 1975 1975 1975

Insecticide gas, poisonous,

133

1967 1967 1967 1975

10.2 km (6.3 ml) 4.1 km (2.6 ml) 2.4 km (1.5 ml) 1.9 km (1.2 m)

(3.5 ml)

5.6 km 1,4 km

(3000 ft) (1000 ft)

1000 m

2.5 km (1,6 mi)

(0.3 m)

0.5 km 0.2 km 0.1 km 0.1 km

(300 tt) (100 ft) (100 ft) (100 ft)

100 E 30 m 30 m 30 E

Compressed gas, toxic, n.o.s. Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone A)

5 5

1955 1955

Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone B) Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone C)

123

1955 1955 1955 1955

53 52

(0.9 m)

300 m 150 m

(0.5 ml)

(0.1 m) (0.1 ml) (0.1 mi)

(0.6 ml)

D.9 km

(500 ft) (300 ft)

(0.5 mi)

0.7 km

100 m

0.2 km (0.1 ml) 0.3 km (0,2 mi) 0.8 km

Compressed gas, toxic, n.o.s. (Inhalation Hazard Zone D)

恕

(6.0 m)

4.4 km

(1500 ft)

500 m

(21 m)

. ₩.

(0.7 mi)

1.0 km

(300 ft)

100 E

Organic phosphate compound mixed with compressed gas Organic phosphate mixed with compressed gas compound mixed with compressed gas

52 133

1955

1955

96pt 302		
(0.5 m) (0.5 m	(0.7 m)	(2.5 ml)
### Deckages) #### Deckages) ####################################	-	
Stand peack stand peack stand peack stand peack stand peack stand burn with stand st	1.0 km	2
ARGE SPILLS ARGE SPILLS PROTECT PROT	(0.4 ml)	(1,4 ml)
LARGE ackage or the markage or the m	0.6 km	2.2 km
First Firs	(200 ft)	(600 ft)
(Frod	m 09	200 m
(1.5 m)	(0.2 m)	음 5
1. SPILID I STORIC CONTROLL I SPILID I	0.3 km	(0.4 m) 1.7 km (1.1 m)
	(E	구 (전통) 음
SPILLS S	1 1	
SMALL SPILLS. SAMALL SPILLS. SAMALL SPILLS. TO PROPER TO THE PROPERTY SHOWN TO THE PR	0.2 km	0.6 km
First Feb.	(100 ft)	(200 ft)
From a 150 m Maters 150 m Maters 150 m Maters 150 m	30 m	E 09
First Firs	Trichloroacetyl chloride	Thiophosgene
131 131 131 132 132 132 132 132 132 132	82	157
No. No. 2382 2382 2407 2417 2417 2417 2417 2418 2418 2418 2418 2418 2418 2418 2418	2442	2474

Projestvi.

		j.	ď			= =	+	ł się			· · · =	1			ja Line			
	LARGE SPILLS (From a large package or from many small packages)	er Ect	persons Downwind during	Kilometers (Miles)	7.4 km (4.6 m)	2.1 km (1.4 m)	5.7 km (3.6 ml)	3.8 km (2.4 ml)	3.7 km (2.3 mi)	0.4 km ((0.3 m))		10.2 km (6.3 m)	11.0+ (m (7.0+ m))	2.5 km (1.6 ml)	11:0+ km (7.0+ m)	4.4 km (2.7 m)	[6,7 km (4.2 m)]	
	LARGE SPILLS ckage or from many	PROTECT	ersons Dow	DAY Kilometers (Miles)	(2.8 mi)	(0.4 ml)	(1.1 皿)	(0.7 ml)	(0.7 ml)	(0.2 ml)	Refer to table 3	(3.5 ml)	(5.6 mi)	(0.8 ml)	(6.1 ml)	(1.2 mi)	(1.8 ml)	
? ?	LARGE nackage or		۵	I Kilomet	4.5 km	0.6 km	1.7 km	1.2 km	1.1 km	0.2 km	Refer	5.6 km	8.9 km	1,2 km	9.8 km	1.9 кт	2.9 km	
	m a large p	First SOLATE	in all Directions	s (Feet)	(1250 ft)	(200 ft)	(1250 ft)	(1000 ft)	(1000 ft)	(500 ft)		(3000 ft)	(3000 ft)	(600 ft)	(3000 #)	(1000 ft)	(1500 ft)	
	. (F)	OSI	in all D	Meters	400 m	ш 09	400 m	300 m	300 m	150 m		1000 m	1000 m	200 m	1000 m	300 m	200 m	
हान्त्रभागान्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त्रात्त	SMALL SPILLS From a small package or small leak from a large package)	ECT	persons Downwind during	Mile NIGHT Kilometers (Miles)	(0.6 ml) 2.0 km _ (1.2 ml)	0.5 km (0.3 m)	0.8 km (0.5 m)	0.6 km (0.4 m)	0.5 km (0.4 mi)	0:1 km (0.1 m)	0.3 km (0.2 m)	(0.6 ml) 3.8 km (2.4 ml)	(1.2 ml) 5.7 km (3.6 ml)	(0.1 ml) 0.4 km (0.2 ml)	6.7 km (4.2 mi)	0.5 km (0,3 m)	3.0 km (1.9 mi)	
	SMALL SPILLS kage or small leak fro	PROTECT	rsons Dow	DAY Kilometers (Miles).	(0.6 mi)	(0.1 mi)	(0.1 ml)	(0.1 mi)	(0.1 m)	(0.1 ml)	(0.1 ml)	(0.6 mi)	(1.2 ml)	(0.1 mi)	(1.0 ml) 6.7 km	(0.1 ml)	(0.5 ml)	- 1616c1 - 87c
100	MALL age or sm		ä	D. Kilomete	my 6.0	0.1 km	0,2 km	0.1 km	0,1 km	0.1 km	0.1 km	1.0 km	1.9 km	0.1 km	1.6 km	0.1 km	0.7 km	
WINDLE INTRACT SOCIETION VIND	small pack	First ISOLATE	in all Directions	(Feet)	(300 ft)	(100 ft)	(200 ft)	(100 ft)	(100 ft)	(100 ft)	(100 ft)	(500 tt)	(1000 #)	(100 ft)	(1000 ft)	(1001)	(200 ft)	
	(From a	୍ର	inallD	Meters	100 m	30 m	ш 09	30 m	30 ш	30 m	30 m	150 m	300 m	30 m	300 m	30 m	150 m	
				NAME OF MATERIAL	Iron pentacarbonyl	Magnesium diamide (when spilled in water)	Magneslum phosphide (when spilled in water)	Potassium phosphide (when spilled in water)	Strontium phosphide (when spilled in water)	Nitric acid, red fuming	Hydrogen chloride, refrigerated liquid	Arsine	SA (when used as a weapon)	Dichlorosilane	Oxygen difluoride Oxygen difluoride, compressed	Sulfuryl fluoride Sulphuryl fluoride	Germane	
				Guide	131	135	139	55	139	157	125	139	119	119	124 124	123 123	119	
				으용	1994	2004	2011	2012	2013	2032	2186	2188	2188	2189	2190 2190	2191 2191	2192	

800 m (2500 lt) 8.4 km (5.2 ml) [1].04 km; (7.0+ ml) 1000 m (3000 ft) | 11.0+ km (7.0+ mi) | 1.0+ km (7.0+ mi)

> 100 m (300 ft) 1.4 km (0.5 m) (3.0 km (1.9 m) 60 m (200 ft) 0.8 km (0.5 m) (1.8 km (1.1 m) 60 m (2001) 0.6 km (0.4 m) 1.2 km (0.7 m) 60 m (2001) 0.6 km (0.4 m) 1.1 km (0.7 m) 60 m (200 ft) 0.8 km (0.5 ml) 1.3 km (0.8 ml)

 2482
 155
 n-Propyl socyanate

 2483
 155
 Isopropyl isocyanate

 2484
 155
 tert-Bulyl isocyanate

600 m (2000 ft)

400 m (1250 tt) 4.3 km (2.7 mi) 7.0 km (4.3 mi)

11.0+ km (7.0+ mi) [11.0+ km (7.0+ mi) 7.1 km (4.4 ml) (10.8 km (6.7 ml)

1000 m (3000 ft)

(2.8 mi)

1.5 km (1.0 mi) 4.4 km

(200 ft)

150 m

Methyl isocyanate 2480 155 Methyl isocyanate 2481 155 Ethyl isocyanate

150 m (500 ft) 2.0 km (1.2 mi) - 5.1 km (3.2 mi) 100 m (300 ff) 1,3 km (0.8 ml) 2,7 km (1.7 ml)

0.3 km (0.2 ml)

0.2 km (0.2 ml)

(100 ft)

(0.1 ml) [0.1 km] [0.1 ml)

0.1 km (100 ft)

30 m

155

듄

(2.7 ml) 7.0 km (4.3 ml)

4,3 km

400 m (1250 tt)

0.8 km (0.5 m) 1.8 km (1.1 m)

(200 ft)

E0 m

Isocyanate solution, flammable, polisorouts, n.cs.
Isocyanate solution, flammable, flock, n.cs.
Isocyanates ilammable, solutions n.cs.
Isocyanates, flammable, todic, n.cs.
n.cs.
n.cs.

155 155

> 2478 2478

2478 2477

135

200 m (600 lt) 2.5 km (1.6 ml) 4.0 km (2.5 m) 200 m (800 lt) 2.5 km (1.6 ml) 4.0 km (2.5 m)

| 300 m (1000 ft) | 3.1 km (1.9 ml) 4.6 km (2.9 ml)

0.9 km (0.6 ml) 1.3 km ျ (0.8 ml) (0.7 ml) 4.1 km (2.6 ml)

100 m (300 ft)

0.3 km (0.2 m) | 0.4 km | (0.2 m)

30 m (100 ft)

100 m (300 ff) 1.1 km

30 m (100 ft) 0.1 km (0.1 ml) 0.5 km (0.4 ml)

lodine pentafluoride (when spilled in water)

2488 155 Cyclohexyl isocyanate 2495 144 lodine pentafluoride

 2485
 155
 n-Butyl isocyanate

 2486
 155
 lsobutyl isocyanate

 2487
 155
 Phentyl isocyanate

0.3 km (0.2 m) 0.4 km (0.3 m) 0.5 km (0.4 m) 1.4 km (0.9 m)

30 m (100 ft) 100 m (300 ft)

30 m (100 tt) 0.1 km (0.1 mt) 0.13 km; (0.2 mt) 30 m (100 tt) 0.1 km (0.1 mt) 0.3 km; (0.2 mt) 100 m (300 tt) 0.5 km (0.3 mt) 2.5 km; (4.6 mt)

2521 131P Diketene, stabilized 2534 119 Methylchlorosllane 2548 124 Chlorine pentafluoride

124 Chlorine pentafluoride

5.2 km (3.3 mi) (1.0+ km (7.0+ ml)

800 m (2500 ft)

-27	
- 54 5 ≢	
57° 56.	
7 - 2 2.2 - 2 - 2 - 2 - 2 - 2	
andria sa strategram in in the second and second in the second se	

WARLEN - WHARL BOUNGARON AND PAGINDANE COMPANY OF THE WARLENGE

					ing ik											
	ages)	Ď	Kilometers (Miles)		(0,6 п)	(0.3m)	(0.6 m)	(3.0 m)		(0.4 m)	(1.7 ml)	(0.2 m)	(3.2 ml)	(0.4 m))	(1.4 ml)	
	small pack	Then PROTECT is Downwind duri			0.1 F	0.4	Ē		2.7 km	0.6 km	2.7 km	0.3 km	5.1 km	0.5 km	23 km	
	ARGE SPILLS skage or from many	Then PROTECT persons Downwind during	DAY Kilometers (Miles)		(0,3 mi)	(0.2 mi)	(0.3 mi)	(1.3 ml)	(f1 m)	(0.4 mi)	(1.1 m)	(0.2 ml)	(0.7 mi)	(0.2 mi)	(0.8 mi)	
-92	LARGE SPILLS (From a large package or from many small packages)	8	I Kilomet		0.5 km	0.3 km	0.5 km	2.1 km	1,8 km	0.5 km	1.8 km	0.4 km	1.2 km	0.4 km	1,3 km	
S MAG	om a farge p	First ISOLATE In all Directions	s (Feet)		(300 ft)	(200 ft)	(300 ft)	(1250 fl)	(1000 ft)	(300 ft)	(1000 lt)	(200 ft)	(600 ft)	(100 ft)	(300 ft)	
		ISC Dilecti	Meters		100 m	m 09	100 m	400 m	300 m	100 m	300 m	ш 09	200 m	30 m	100 m	
SERVICES INDIVATOR SALESCE ON THE WORK OF THE SERVICES OF THE	SMALL SPILLS From a small package or small leak from a large package)	during	Kilometers (Miles)		n (0.2 mi)	m (0.1 m)	0.3 km (0.2 m)	III (0) г	n (0.5 ml)	ர் (0.1 mi)	n (0.5 ml)	(0.1 km (0.1 ml)	n (0.7 ml)	n (0.1 m)	n (0.5:ml)	
 ন্থ	S from a la	Then PROTECT persons Downwind during			(0.1 m)) 0.3 km	.0.1km) 0.3 kg	1.1 km) 0.7 km) 0.2 km) 0.7 km		ux III () 0.2 km) 0.7km	
ON P	SPILL nall leak	PH ersons D	DAY Kilometers (Miles)			(0.1 m)	(0.1 mi)	(0.3 ml)	(0.3 ml)	(0.1 ml)	(0.3 ml)	(0.1 mi)	(0.2 mi)	(0.1 mi)	(0.2 mi)	
	SMALL SPILLS kage or small leak from	d	Kilometr		0.1 km	0.1 km	0.1 km	0.4 km	0.4 km	0.2 km	0.4 km	0.1 km	0.2 km	0.1 km	0.3 km	
(0) (1) (1)	small pack	First ISOLATE in all Directions	s (Feet)		(100 ft)	(100 ft)	(100 ft)	(200 ft)	(200 ft)	(1001)	(200 ft)	(100 ft)	(200 ft)	(100 tt)	(100 ft)	
	(From a	OSI In all	Meters		E 90	90 E	30 m	E 09	E 09	30 m	m 09	30 m	E 09	30 m	30 m	
	•		NAME OF MATERIAL	L (Lewisite)	(when used as a weapon) Lewisite (when used as a weapon)	Mustard (when used as a weapon)	Mustard Lewisite (when used as a weapon)	Sarin (when used as a weapon)	Soman (when used as a weapon)	Tabun (when used as a weapon)	Thickened GD (when used as a weapon)	VX (when used as a weapon)	CX (when used as a weapon)	Ethyl chlorothioformate	Ethy! phosphonous dichloride, anhydrous	
			Guide	153	153	153	153	153	153	153	153	153	154	155	135	
	์ วิสตะ	8600	⊖ Š.	2810	2810	2810	2810	2810	2810	2810	2810	2810	2811	2826	2845	

			(From a	Small park	SMALL SPILLS	SPILLS	SMALL SPILLS From a small package or small back from a fame package	(From	a large of	LARGE SPILLS	SPILLS	LARGE SPILLS	i į
				1000	5	100	Contract of the contract	2	200	newage of 1	on Haily	alliali pachages)	i
			ISO In all D	First ISOLATE In all Directions	<u>8</u> .	TE PRO ISONS DOW	Then PROTECT persons Downwind during	First ISOLATE in all Directions	TE Stellors	ber	Then PROTECT Isons Downwind	Then PROTECT persons Downwind during	
<u>.</u>	Guide	NAME OF MATERIAL	Meters	(Feet)	D, Kilometei	DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	Meters	(Feet)	D. Kilomete	DAY Kilometers (Miles)	Kilometers (Miles)	
2600	119	Carbon monoxide and Hydrogen mixture, compressed Hydrogen and Carbon monoxide mixture, compressed	E 08	(100 ft)	0.1 km	0.1 km (0.1 mi)	0.2 km (0.1 m)	200m (6	(1) (009)	1.2 km	(0.7 ml)	4.4 km (2.8 m)	
2605	55	Melhoxymethyl isocyanate	30 m	(100 ft)	0,3 km	(0,2 mi)	0.5 km (0.3 m)	100 m (t	(300 ft)	1.0 km	(0.7 m)	1.5 km (1.0 ml)	
5606	155	Methyl orthosilicate	30 E	(100 ft)	0.2 km	(0.1 mi)	(0.1 ml) 0.3 km (0.2 ml)	g) m 09	(200 ft)	0.6 km	(0.4 m)	0.9 km (0.6 ml)	
2644	151	Methyl iodide	30 m	(100 ft)	0.1 km	(0.1 ml)	(0.1 ml) 0.2 km (0.1 ml)	у) ш09	(200 ft)	0.3 km	(0.2 mi)	0.6 km = (0.4 ml)	
2646	151	Hexachlorocyclopentadiene	30 m	(100 ft)	0.1 km	(0.1 ml)	(0.1 m) 0.1 km (0.1 m)) woe	(1001)	0.3 km	(0.2 ml)	0.4 km (0.2 ml)	
2668	131	Chloroacetonitrile	30 m	(100 ft)	0.1 km	(0.1 m)	(0.1 ml) 0.1 km (0.1 ml)	1) wos	(100 ft)	0.3 km	(0.2 mi)	0.4 km = (0.2 m)	
2676	119	Stibine	₩ 09	(200 ft)	0.3 km	(0.2 mi)	(0.2 mi) 1.6 km ((1.0 m))	300 m (6	(1) 009)	1.2 km	(0.8 m)	4.2 km (2.6 ml)	
2691	137	Phosphorus pentabromide (when spilled in water)	30 m	(100 ft)	0.1 km	(0.1 mi)	0.1 km (0.1 m)) woe	(100 ft)	0.2 km	(0.1 mi)	0.7 km (0.4 m)	
2692	157	Boron tribromide (when spilled on land)	30 m	(100 ft)	0.1 km	(0.1 ml)	0.2 km (0.1 m)	30 m (1	(100 ft)	0.2 km	(0.1 m)	0.4 km (0.3 ml)	Fr.
2692	157	Boron tribromide (when spilled in water)	30 m	(100 ft)	0.1 km		(0.1 ml) 0.3 km (0.2 ml)	у) ш09	(200 ft)	0.5 km	(0.3 mi)	1.7 km (1.1 mi)	
2740	155	n-Propyl chloroformate	30 m	(100 ft)	0.1 km	(0.1 mi)	(0.1 mi) 0.3 km (0.2 mi)	90 m (5	(200 ft)	0.5 km	(0.4 mi)	1.0 km (0.6 m)	
2742	155	sec-Butyl chloroformate	30 ₪	(100 II)	0.1 km	(0.1 mi)	(0.1 ml) 0.2 km (0.1 ml)	30 m (1	(1001)	0.4 km	(0.2 ml)	0.5 km (0.3 mi)	-
(45 45					(<u> 2</u>

	2901 1	2927 1	2977 1	2977 1	2978 1	2978 1	2085 1	1 986	100	2988		
											ey@s	19
								v/j*≟+÷				
	2.6 km (1.6 ml)	2.4 km (1.5 ml)	1(9 km = (1.2 ml)	1 m 6 9 m 1 6 0 v.	() () () () () () () () () ()	2.6 km (1.6 ml)	24 km (1.5 ml)	1.9 km (1.2 m)	102 km (6.3 mi)	4.1 km (2.6 m)	24 km (1.5 ml)	श्रीवामद्वशिद्धानम् वृत्यः
COLUMN TO	(0.8 ml) 2	(0.6 m) 2	(0.5 ml) 1	, (L		(0.8 mi)	(0.6 mi) 2	(0.5 ml)	(3.5 ті)	(0.9 ml)	(0.6 ті)	
	1.2 km	0.9 km	0,7 km	4,0	Dio Dio	1.2 km	0.9 km	0.7 km	5.6 km	1.4 km	0.9 km	
	(1) (009)	(500 ft)	(300 ft)	(# 0006/ == 000+	(11 0000)	(600 ft)	(500 ft)	(300 ft)	(3000 ft)	(1000 ft)	(500 ft)	Communication of the last of t
	200 m	150 m	100 ш	1000	3	200 m	150 m	100 ш	1000 m	300 m	150 m	A COLUMNIA
ever.	0.4 km (0.2 ml)	0.3 km (0.2 m)	0.2 km (0.1 ml)	(W.O.W.	0.4 km (0.2 ml)	0.3 km (0.2 m))	0.2 km (0.1 ml)	2.5 km (1.6 ml)	0.8 km (0.5 m)	0.3 km (0.2 m)	intelline late of the
	(0.1 ml)	(0.1 m)	(0.1 ті)			(0.1 m)	(0.1 mi)	(0.1 ml)	(0.3 m)	(0.1 ml)	(0.1 ml)	- STATES
	0.1 km	0.1 km	0.1 答	(H 3 t) H 10 t	2	0.1 km	0.1 km	0.1 km	(300 ft) 0.5 km	0.2 km	0.1 km	
	(100 ft)	(100 ft)	(100 ft)	(500 4)	hi noe)	(100 ft)	(100 ft)	(1001)	(300 ft)	(100 ft).	(100 ft)	III Section
	30 m	30 m	30 m	# 63 7	<u>≣</u> B	30 m	30 m	30 m	100 m	30 m	30 m	BAIGIP!
	Liquelied gas, poisonous, . flammable, n.o.s. (inhafation Hazard Zone B)	Liquetied gas, poisonous, fammable, n.o.s. (inhalation Hazard Zone C)	Liquefied gas, polsonous, flammable, n.o.s. (Inhafation Hazard Zone D)	Liquefied gas, toxic, flammable, n.o.s.	no.s. (Inhalation Hazard Zone A)	Liquefied gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone B)	Liquefled gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)	Liquefled gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)	Liquefied gas, poisonous, n.o.s. Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone A)	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone B)	Liquefied gas, poisonous, n.o.s. (inhalation Hazard Zone C)	San
	119	119	£ 13	119		119	119	119	22 23	123	123	
Producer	3160	3160	3160	3160	8	3160	3160	3160	3162 3162	3162	3162	

2.1 km (1.4 m)

(0.3 m)

0.5 km

(200 ft)

9 E

0.4 km (0.3 m)

(0.1 mi)

0.1 km

(100 ft)

30.11

Radioactive material,
Uranium hexafluoride, fissile
(when spilled in water)
Uranium hexafluoride,
radioactive material, fissile
(when spilled in water)

166

0.2 km (0.1 m)

0.2 km 0.3 km

(100 ft)

8 8

(0.1 m) 0.1 km (0.1 ml)

30 m

(0.1 ml) (0.1 km) (0.1 ml)

(100 ft)

Ethyl phosphorodichloridate

166

0.3 km (0.2 ml)

(0.2 m)

(1.2 m) 3.5 km (2.2 m) (2.8 m) 10.0 km (6.2 m)

(2.8 mi) (0.1 mi)

1.9 km 4.5 km

(500 tt) (2500 ft)

150 m 800 m

0.4 km (0.2 ml) 10 km (0.7 ml) 0.5 km (0.3 ml) 18 km (1.1 ml)

0.5 km 0.1 km 0.1 km

(100 ft)

30 m 30 m 30 m

Methyl phosphonous dichloride

 135
 42
 42

 45
 45
 45

(100 ft)

Bromine chloride Ethyl phosphonothioic dichloride, anhydrous 2.1 km (1.4 m)

(0.3 ml)

0.5 km

(200 ft)

ш 09

0.4 km (0.3 ml)

(0.1 mi)

0.1 km

(100 ft)

30 m

Radioactive material,
Uantium hexaltuoride, non
Itsale or fissile-excepted
(when spilled in water)
Uantum bazaltuoride,
adjoactive material, non
Itsale or fissile-excepted
(when spilled in water)

166

166

(1.0 m)

1.6 km

(0.3 m)

0.5 km 0.5 km

. E

(0.1 mi)

0.2 kg

(0.1 mi)

0.1 km

(100 ft)

80 80 E

Chlorosilanes, corroslve, flammable, n.o.s. (when spilled in water)

155

1.6 km (1.0 m)

(0.3 ml)

0.5 km

(200 ft)

E 09

0.2 km (0.1 m)

(0.1 mi)

0.1 km

(100 ft)

30 ਜ

Chlorosilanes, flammable, corrosive, n.o.s. (when spilled in water)

뉹

1.6 km (1.0 m)

(0.3 ml)

0.5 km

(200 ft)

60 E

(0.1 m) 0.2 km (0,1 m)

0.1 km

(100 ft)

1.6 km (1.0 mi)

(0.3 ml)

(200 ft)

E0 m

0.2 km (0,1 m)

(100 ft)

Chlorosilanes, corrosive, n.o.s, (when spilled in water)
Chlorosilanes, water-reactive, flammable, corrosive, n.o.s. (when spilled in water)

35 55

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	Prince	320										
				() () () () () () () () () ()				14.1	4			1
	(98)		T. (Miles)	(1.2 ml)	(6.3 m)	(2.6m)	(1.5 m)	(1,2 ш)	(0.5 _{(III})	(1.6 m)	(1,6 ml)	
	II package	Then PROTECT persons Downwind during	NIGHT Klometèrs (Miles)	1.9 km	102.km 3	4.1 km	2.4 km	19-кт	0.8 кт	255 km	25 th	
	LLS any sma	Then PROTECT Is Downwind	_									運動をかって
	LARGE SPILLS ckage or from many	P Persons	DAY Kilometers (Miles)	(0.5 mi)	(3.5 m)	(im 6:0)	(0.6 mi)	(0.5 mi)	(0.4 mi)	(0.9 ml)	(0.9 ш)	
(1 <u>7</u>	LARG package o		Kilom	0.7 km	5.6 km	1.4 km	0.9 km	0,7 km	0.6 km	1.4 km	1.4 km	<u> </u>
Sept.	LARGE SPILLS (From a large package or from many small packages)	First ISOLATE In all Directions	Meters (Feet)	(300 ft)	(3000 ft)	(1000 ft)	(200 ft)	(300 ft)	(200 ft)	(200 (1)	(500 fl)	
5 0	(Fron	180!	Meters	100 m	1000 m	300 ₪	150 m	100 m	m 09	150 m	150 m	
AND THE	ackage)	Ē	(Miles)	0.1 mi)	(f.6 m)	(0.5 ml)	(0.2 mi)	(0.1 (m.)	0.2 ml)	(0,4 m)	(0.4 m)	
SEIIO	SMALL SPILLS From a small package or small leak from a large package)	Then PROTECT persons Downwind during		0.2 km (0.1 m)		0.8 km	0.3 km	0.2 km	0.3 km (0.2 m)		E 200	
-	PILLS II leak fror	Then PROTECT sons Downwing		(0.1 ml)	(0.3 m) 2.5 km	(0.1 m)	(0.1 ml)	(0.1 mi)	(0.1 ml)	(0.2 ml)	(0.2 m)) O.7 km	pelalus le eur
W. HOLE	SMALL SPILLS kage or small leak fr	bed	DAY Kilometers (Miles)	0.1 km	0.5 km	0.2 km	0.1 km	0.1 km	0.2 km	0.3 km (0.2 m) 0.7 km	0,3 km	
103	S mall packs	ATE	\neg	(1001)	(300 ft)	(100 ft)	(100 ft)	(1001)	(1001)	(100 ft)	(100 ft)	
	(From a si	First ISOLATE in all Directions	Meters (Feet)	30 m	100 m	80 E	30 ш	30 m	30 m	30 m	30 H	
ASIO MONOVE EMPLORACIONE DIMENTO NO MONOMENTO DE EMPLOYMENTO DE EMPLOYMENTO DE LA COMPONIO DE LA COMPONIO DE L			NAME OF MATERIAL	Liquefied gas, poisonous, n.o.s. (Inhalation Hazard Zone D)	Liqueffed gas, toxic, n.o.s. Liqueffed gas, toxic, n.o.s. (Inhalatlon Hazard Zone A)	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone B)	Liquefied gas, toxic, n.o.s. (inhalation Hazard Zone C)	Liquefied gas, toxic, n.o.s. (Inhalation Hazard Zone D)	Methanesulfonyl chloride Methanesulphonyl chloride	Nitriles, poisonous, Ilammable, n.o.s. Nitriles, toxic, Ilammable, n.o.s.	Nitriles, liquid, poisonous, n.o.s., Nitriles, liquid, toxic, n.o.s., Nitriles, poisonous, liquid, n.o.s., Nitriles, poisonous, n.o.s., Nitriles, toxic, iquid, n.o.s., Nitriles, toxic, n.o.s.	
			Guide	123	22 22 23	123	123	123	156 156	131	151 151 151 151 151	
			9 ಕೈ	3162	3162 3162	3162	3162	3162	3246 3246	3275 3275	3276 3276 3276 3276 3276 3276	

Page (BB)

7 5 T												
	. (səb	. 5	HT S (Miles)	(0.4 m)	(E.W.	(0.8 m)	(0.8 m)	(5.9 mi)	(1.6 m)	(6.0 ml)	(6.3 m)	
	nall packa	CT Wind during	NIGHT Klometers (Miles)	0.7 km	7.0 km	<u>ā</u>	1.33.km (0.8 m)	9.5 km	2.5 km	9.6 km	10.2 km	
-	LARGE SPILLS (From a large package or from many small packages)	Then PROTECT persons Downwind during	DAY Kitometers (Miles)	(0.3 mi)	(12 ml)	(0.3 ml)	(0.3 mi)	(2.5 ml)	(0.9 ml)	(2.8 mi)	(3.5 ml)	178
ē	LARGE ackage or f	e.	D Kilomete	0.5 km	2.0 km	0.4 km	0.4 km	4.0 km	1.4 km	4,5 km	5.6 km	
	n a large p	First ISOLATE in all Directions	Meters (Feet)	(200 ft)	(1500 fl)	(200 fl)	(200 fl)	(2000 ft)	(1) OOS)	(2500 ft)	(3000 ft)	
n din		A OSI Olle ni	Meters	e0 m	₩ 00S	m 09	ш 09	ш 009	150 m	m 008	1000 m	
Naviga I	package)	ing	NIGHT Klometers (Miles)	(0,1 m)	(0.6m)	(0.1 ml)	(0.1 m)	(0.6 m)	(0.4 m)	(0.7 m)	(2:4 ml)	
	m a large	Then PROTECT is Downwind dui		0.2 km (0.1 m)	(0.2 mi) 0.9 km (0.6 mi)	(0.1 ml) 0.2 km (0.1 ml)	(0.1 m) 0.2 km (0.1 m)	(0.1 ml) 0.9 km (0.6 ml)	(0.2 ml) 0.7 km (0.4 ml)	1.1 km	(0.6 mi) 3.8 km	
of the second	SPILLS all feak fro	Then PROTECT persons Downwind during	DAY Kilometers (Miles)	(0.1 mi)	(0.2 mi)	(0.1 mi)	(0.1 mi)	(0.1 ml)	(0.2 ml)	(0.2 ml) .1.1 km	(0.6 mi)	
illinillik	SMALL SPILL kage or small leat	8.	D/ Kilometer	0.1 km	0.2 km	0.1 кт	0.1 km	0.2 km	0.3 km	0.2 km	1.0 km	
	SMALL SPILLS From a small package or small leak from a large package)	First ISOLATE In all Directions	(Feet)	(100 ft)	(200 ft)	(100 ft)	(100 ft)	(100 ft)	(100 ft)	(100 ft)	(500 ft)	
	(From a	ISOI in all Di	Meters	8 E	ш 09	ш08	30 m	30 m	30 m	30 m	150 m	
STREET, CO.			Guide NAME OF MATERIAL	2-Methyl-2-heptanethiol	Atuminum phosphide pesticide (when spilled in water)	Metal atkyl hatides, water-reactive, n.o.s. (when spilled in water) Metal aryl hatides, water-reactive, n.o.s. (when spilled in water)	Aluminum alkyl halides, liquid (when spilled in water) Aluminum alkyl halides, solid (when spilled in water)	Trifluoroacetyl chloride	Methacrylonlirile, stabilized	Perchloryl fluoride	Liquelled gas, polsonous, flammable, n.o.s. Liquelled gas, polsonous, flammable, n.o.s. (Inhalation Hazard Zone A)	
			Guide	13	157	138	135	125	131P	124	119	
	24 (e(e.	3120	οġ	3023	3048	3049	3052	3057	3079	3083	3160 3160	

3278 3278	3278	3278	3279	3280	3281	3294	3300	
			y gazar. Nagar					Bigge SE
						4.54.		
(1.5 m)	(12m)	(5.6 m)	(3:0 ml)	(1.6 m)	(12m)	(5.6 m)	(B.0 m)	(1.6 ml)
2.4 km	1.9.km	9.0.km	4.8 km	2.6 km	Ē.61	9.0 km	4.8 km	2.6 km
(0.6 m))	(0.5 ml)	(1.9 mi)	(1.4 ml)	(0.6 ml)	(0.5 ml)	(1.9 ml)	(1,4 mi)	(0.5 mi)
0.9 кт	0,7 km	3.0 кт (1,9 ті)	2.2 km	0.9 km	0.7 km	3,0 km	2.2 km	0.9 km
(200 ft)	(300 ft)	(1500 ft)	(1250 ft)	(500 ft)	(200 ft)	500 m (1500 ft)	-	(500 ft)
150 m	100 m	500 m (1500 ft)	400 m	150 m	150 m	500 m	400 m (1250 ft)	150 m
(0.2'mi)	(0.1 mi)		(0.6m)		8	(1.5.m)	(0.6m)	03m)
0.3 km		0.6 km (0.4 mi) 2.5 km ((1.5 mi)	1.0 km	(0.1 ml) 0.4 km (0.3 m)			1.0 FF	6 Ē
 (0,1 mi)	(0.1 ml) 0.2 km	(0.4 mi)	(0.2 m) 1.0 km	(0.1 mi)	(0.1 m) 0.2 km	(0.4 m) 2.5 km	(0,2 ml)	(0.1 mi)
0.1 km	0.1 km	0.6 km	0.2 km	0.1 km	0.1 km	0.6 km	0.2 km	0.1 km
(100 tt)	(100 ft)	100 m (300 ft)	(100 ft)	(100 ft)	(100 ft)	(300 ft)	(100 ft)	(100 ft)
30 m	30 m	100 m	30 m	90 m	98 H	100 m	30 m	30 m
Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone C)	Compressed gas, toxio, oxidizing, n.o.s. (Inhalation Hazard Zone D)	Compressed gas, polsonous, corrosive, n.o.s. Compressed gas, polsonous, corrosive, n.o.s.	Undiation Hazard Zone A) Compressed gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone B)	Compressed gas, polsonous, corrosive, n.o.s. (Inhalation Hazard Zone C)	Compressed gas, polsonous, corrosive, n.o.s. (Inhalation Hazard Zone D)	Compressed gas, toxic, corrosive, n.c.s. Compressed gas, toxic, corrosive, n.c.s. toxic, corrosive, n.c.s. toxic, corrosive, n.c.s.	Compressed gas, toxic, corrosive, n.o.s. (Irhalation Hazard Zone B)	Compressed gas, toxic, corrosive, n.o.s. (inhalation Hazard Zone C)
124	124	£ £	52	123	123	123	123	123
3303	3303	3304	3304	3304	3304	3304	3304	3304

(2.2 ml)

(1.2 ml)

1.9 km

(500 ft)

150 m

(0.2 m) 1.0 km (0.7 m)

0.4 km

(100 ft)

30 m

Organophosphorus compound, induid, postonous, no.s., Organophosphorus compound, Irquid, loxic, no.s. Organophosphorus compound, Organophosphorus compound, Organophosphorus compound, Organophosphorus compound, Irode, Irquid, no.s. Organophosphorus compound, Irode, Irquid, no.s. Organophosphorus compound, Irode, Irquid, no.s.

क क क

(2.2 ml)

3.5 km

(1.2 ml)

1.9 km

(200 ft)

150 m

(0.7 mi)

.. M

(0.2 mi)

0.4 km

(100 ft)

30 E

Organophosphorus compound, poisonous, flammable, n.o.s. Organophosphorus compound, toxic, flammable, n.o.s.

13

13

151 151

(2.2 ml)

3.5 km

(1.0 m)

1.5 km

(500 ft)

150 m

(0.5 mi)

07 P

(0.1 m)

0.2 km

(100 ft)

30 m

Organoarsento compound, liquid, n.o.s. Organoarsento compound, n.o.s.

15 151 (1.2 m.)

₽ 6.

(0.5 mi)

0.7 km

(300 fl)

100 ш

0.2 km (0.1 mi)

(im. 1.0)

0.1 km

(100 ft)

30 E

Hydrogen cyanide, solution in alcohol, with not more than alcohol, with not more than 45% Hydrogen cyanide and Ethylene oxide midutue, with more than 87% Ethylene oxide and Cabon doxide mixture, with more than 87% Ethylene oxide for the solution of the solution oxide mixture, with more than 87% Ethylene oxide

119P 119P ම්ලේදීම් මෙම මෙම මෙම මෙම මෙම මෙම මෙම මෙම මෙම

(1.2 mi)

_6 ₽

(0.3 mi)

200 m

0.3 km (0.2 m)

(0.1 m)

0.1 km

93 30

11.0+ 阿 (7.0+ 则)

(7.0+ mi)

11.0+ km .0.5 km

(3000 (1) (600 ft)

1000 m

(0.9 ml) 4.9 km (3.0 ml)

(300 ft) (1001)

100 m

Metal carbonyls, liquid, n.o.s. Metal carbonyls, n.o.s.

5 5 E

	LARGE SPILLS From a large package or from many small packages)	Then PROTECT persons Downwind during	Kilométers (Miles)	11.0+ km (7.0+m)	9.6 km (6.0 m)	2.4 km (1.5 mi)	1.9 km (1.2 m)	(m,-6/2): (2,0-m)	9.6 km (6.0 mi)	
	LARGE SPILLS ckage or from many	Th PRO ersons Dow	DAY Kilometers (Miles)	(3.3 ml)	(2.8 mi)	(0.6 ml)	(0.5 ml)	(3.3 mi)	(2.8 ті)	
: ::::::::::::::::::::::::::::::::::::	LARGE nackage or	_	Kilome	5.2 km	4.5 km	0.9 km	0.7 km	5.2 km	4.5 km	-
	n a large	First ISOLATE In all Directions	s (Feet)	(2500 ft)	(2500 ft)	(500 II)	(300 ft)	(2500 ft)	(2500 ft)	
STATION		ISC In all 5		800 m	800 m	150 m	100 m	800 m	B008	,
STATES I NUMBER GOTANION OND PROPRESIDES REPORTED IN STATES AND STATES IN THE STATES OF THE STATES O	SMALL SPILLS From a small package or small leak from a large package)	·	NIGHT Kilometers (Miles)	(0.3 m) 2.5 km (1.6 m)	1.1 km - (0.7 m)	(0.2 m)	(0.1 mi)	(0.3 m) 2.5 km (1.6 m)	(0.7%)	
HETOKATI	som a lan	Then PROTECT as Downwind o		- 2.5 km		0.3 km	0.2 km	2.5 km	(0.2 mi) 1.1 km	
	SPILLS nall leak f	Then PROTECT persons Downwind during	DAY Kilometers (Miles)	l .	(0.2 mi)	(0.1 ml)	(0.1 mi)			
	SMALL SPILLS kage or small leak fr		Kilomet	0.5 km	0.3 km	0.1 km	0.1 km	0.5 km	0,3 km	
IN THE	small pac	First ISOLATE n all Directions	Meters (Feet)	(300 ft)	(200 ft)	(100 ft)	(100 ft)	(300 ft)	(200 ft)	
	(From a	OSI Olle	Meters	100 m	60 m	30 m	30 m	100 m	e: 09	
			Guide NAME OF MATERIAL	Compressed gas, poisonous, oxdizing, n.o.s. Compressed gas, poisonous, oxdizing, n.o.s. (Inhalation Hazzard Zone A)	3	Compressed gas, polsonous, oxidizing, n.o.s. (Inhalation Hazard Zone C)	Compressed gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone D)	Compressed gas, toxic, oxidizing, n.o.s. Compressed gas, toxic, oxidizing, n.o.s. toxic, oxidizing, n.o.s. (Inhalation Hazard Zone A)	Compressed gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone B)	
		l	ъ	57 57						
-				124 13 124	124	124	124	124	124	
	Prue	324	ON No. Gui	3303 12	3303 12	3303 124	3303 124	3303 124	3303 124	
	¥ng∈	<u>32:</u> -		1					1	
				1					1	
			NIGHT ID NO.	3303 (1.2 ml)	3303	3303	3303 [(1.5 ml)	3303 ((1,2 ml)) 3303	(6.3 ml)	
		during	ΩŠ	3303 119 km; (1.2 ml) 3303	10.2.km; (6.3 ml)	2.6.kml (1.6 ml).	2.44m (1.5 ml)	3303 (19 km) (12 m) 3303	10/2 km (6.3 ml) 3303	
		Then PROTECT persons Downwind during	DAY Kilometers (Miles) Kilometers (Miles)	(0.5 m) 1/2 (1.2 m) 3503	5.6 km (3.5 m) (0.2 km; (6.3 m)	(0.8 ml) 2.66 km (1.6 ml).	(0.6 m) 2-4-km (1.5 mi)	(0.5 m) (1.2 m) 3303	5.6 km (3.5 m); 10.2 km (6.3 m)	
	LARGE SPILLS (From a large package or from marity small packages)		DAY Kilometers (Miles) Kilometers (Miles)	0.7 km (0.5 m) 11.9 km; (1.2 m) 8303	(3.5 ml) (102km; (6.5 ml) 3303	1.2 km (0.8 ml) 2.6 km; (1.6 ml)	0.9 km (0.6 m) 2.4 km (1.5 m)	3303 0.7 km (0.5 ml) 195 mm (1.2 ml) 3303	(3.5 ml) 102 km (6.5 ml) 3303	
	LARGE SPILLS (From a large package or from marity small packages)	First Teach	Month (Miles) Meters (Feet) Kilometers (Miles) Kilometers (Miles) (Miles) (Miles) (Miles)	3303 (0.2 mm) (0.1 ml) 150 m (500 ft) 0.7 km (0.5 ml) 11.9 km; (1.2 ml) 3303 3303	3.8 km (2,4 m) 1000 m (3000 ft) 5.6 km (3.5 m) 10.2 km (6.5 m) 3303	3303 O-4-hm (O-2-m) 200 m (500 tt) 1.2 km (O.8 m) 2.6.km (1.6 m)	3303 (1.5 m) 150 m (500 ft) 0.9 km (0.6 m) 2.4 km (1.5 m)	3303 (2.2 m) (10 m) (300 tt) (0.5 m) (1.9 m) (1.2 m) (300 tt) (300	3.8 km (2.4 m), 1000 m (300011) 5.6 km (3.5 m)) 10.2 km (6.3 m) 3303	
	LARGE SPILLS (From a large package or from marity small packages)	Then PROTECT persons Downwind during	Month (Miles) Meters (Feet) Kilometers (Miles) Kilometers (Miles) (Miles) (Miles) (Miles)	(0.1 m) 0.2 km (0.1 m) 150 m (600 t) 0.7 km (0.5 m) 119 km (1.2 m) 8303	(0.6 m) 3.8 km (2.4 m) 1000 m (3000 t) 5.6 km (3.5 m) (0.2 km (6.3 m)) 3303	(0.1 ml) Outum (0.2 ml) 200 m (500 tt) 1.2 km (0.8 ml) 2.6 km (1.6 ml)	(0.1 m); 0.5 km (0.2 m); 150 m (500 ft) 0.9 km (0.6 m); 2.4 km (1.5 m);	(0.1 m) (0.2 km (0.5 m) (0.5 m) (0.5 m) (0.5 m) (0.2 m) (0.5 m) (0.5 m)	(0.6 m) 3.6 km (2.4 m) 1000 m (3000 th) 5.6 km (3.5 m) 10.2 km (6.3 m) 3303	
	LARGE SPILLS (From a large package or from marity small packages)	PROTECT ISOLATE PROTECT ISOLATE PROTECT ISOLATE PROTECT IS IN IN IN ISOLATE PROTECT IN	DAY (Mites) Kilometers (Mites) Kilometers (Mites) Kilometers (Mites) (Mites) (Mites) (Mites) (Mites) (Mites)	0.1 km (0.1 m) 0.2 km (0.1 m) 150 m (500 ft) 0.7 km (0.5 m) 119 km (1.2 m) 3303	1.0 km (0.6 ml) 3.6 km (2.4 ml) 1000 m (3000 ft) 5.6 km (3.5 ml) (0.2 km; (6.3 ml) 3303	0.1 km (0.1 mi) 0.4 km (0.2 mi) 2200 m (600 tt) 1.2 km (0.8 mi) 2.6 km (1.6 mi)	0.1 km (0.1 mi) 0.3 km (0.6 mi) 2.4 km (1.5 mi) 8303	3303 0.1 km (0.1 m) 0.2 km (0.5 m) (0.5 m) (1.9 m) 3303 3303	1.0 km (0.6 m) 3.8 km (2.4 m), 1000 m (3000 th) 5.6 km (3.5 m), 10.2 km (6.3 m)) 3303	
SHOW WE SEE THE SECOND OF THE SECOND		First Teach	DAY (Mites) Kilometers (Mites) Kilometers (Mites) Kilometers (Mites) (Mites) (Mites) (Mites) (Mites) (Mites)	(0.1 m) 0.2 km (0.1 m) 150 m (600 t) 0.7 km (0.5 m) 119 km (1.2 m) 8303	(0.6 m) 3.8 km (2.4 m) 1000 m (3000 t) 5.6 km (3.5 m) (0.2 km (6.3 m)) 3303	(0.1 ml) Outum (0.2 ml) 200 m (500 tt) 1.2 km (0.8 ml) 2.6 km (1.6 ml)	(0.1 m); 0.5 km (0.2 m); 150 m (500 ft) 0.9 km (0.6 m); 2.4 km (1.5 m);	(0.1 m) (0.2 km (0.5 m) (0.5 m) (0.5 m) (0.5 m) (0.2 m) (0.5 m) (0.5 m)	(0.6 m) 3.6 km (2.4 m) 1000 m (3000 th) 5.6 km (3.5 m) 10.2 km (6.3 m) 3303	

tioges<u>ki</u>i:

NAME OF MATERIAL

Guide

요양

23

3304

Compressed gas, toxic, corrosive, n.o.s. (inhatation Hazard Zone D)

Compressed gas, polsonous, fammable, corrosive, n.o.s. Compressed gas, polsonous, fammable, corrosive, n.o.s. (Inhalation Hazard Zone A)

119

3305 3305 Compressed gas, poisonous, flammable, corroslve, n.o.s. (Inhalation Hazard Zone B)

139

3305

Compressed gas, poisonous, fammable, corrosive, n.o.s. (Inhalation Hazard Zone C)

118

3305

Compressed gas, polsonous, flammable, corrosive, n.o.s. (inhafation Hazard Zone D)

119

3305

Compressed gas, taxto, flammable, corrosive, n.o.s. Compressed gas, taxto, flammable, corrosive, n.o.s. (Inhaiatton Hazard Zone A)

139 3305

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	3305 1	3305	3305 1	3306 1	3306	3306	3306	3306 1	3306 1	3306 1	3306 .1	
	8 8	8	ଞ	18	8	8	8 	B	18	7. 7	ikiyieski	
											ongie ver	
	2											
COPINS AN	ե Ծ Ե		(6.0 ml)	(1.5 mi)	(1.2 ml)	(5.6 m))		(3.0.ml)	(I.Bm)	(1.2 m		
	171:0+ km (7:0+mi)		9.6 km	2.4 km	1.9 km	9.0 km	3-49 s	4.8 km	2.6 km	1.9 km (1.2 m)	710-55 	3
	(3.3 m)		(2.8 mi)	(0.6 ml)	(0.5 mi)	(1.9 ml)		(1.4 mi)	(0.6 mi)	(0.5 ml)		
	5.2 km		4.5 km	0.9 km	0.7 km	3.0 km		2,2 km	0.9 km	0.7 km		
	(2500 ft)		(2500 ft)	(500 ft)	(300 ft)	(1500 ft)		(1250 ft)	(500 ft)	(200 11)		Celificia
	B00 m		800 m	150 ш	100 m	500 m		400 m	150 m	150 m		(de ajulaju
ecosar.	(1.6 ml)		(m. 70)	(0.2 m)	(0:1 ml)	(mSt))		(0.6'm)	(0.3 mi)	(0.1 m))		dsoul
i Line	(0.3 m) 2.5 cm		(0.2 mi) 1.1 km	(0.1 ml) 0.3 km (0.2 ml)	(0.1 ml) 0.2 km (0.1 ml)	(0.4 m.) 2.5 km			0.4 km	(0.1 mi) 0.2 km	45 POWER	કેલનામુકાઇલ-સાલા(CSOI) નિર્દાણ ફિલ્મો ગામક ઉપયોગ્ય (જેન્દ્ર તમાન કર્યો કરાઇકો)
				(0.1 ml)	(0.1 ті)			(0.2 mi) 1.0 km	(0.1 mi) 0.4 km			
	0.5 km		0.3 km	0,1 Fa	0.1 km	0.6 km		0.2 km	0.1 km	0.1 km		
•	(300 ft)		(200 ft)	(100 ft)	(100 ft)	(1) 006)		(100 ft)	(100 ft)	(1001)		Alexand
	100 m		m 09	30 m	30 ш	100 m		30 m	30 m	30 m		Sussibility.
	Liquefled gas, toxic, oxidizing, n.o.s. Liquefled gas, toxic,	oxidizing, n.o.s. (Inhalation Hazard Zone A)	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone B)	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, toxic, oxidizing, n.o.s. (Inhalation Hazard Zone D)	Liquefied gas, poisonous, corrosive, n.o.s. Liquefied gas, polsonous,	corrosive, n.o.s. (Inhalation Hazard Zone A)	Liquefled gas, poisonous, corrosive, n.o.s. (Inhalatlon Hazard Zone B)	Liquefled gas, poisonous, corrosive, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, poisonous, corrosive, n.o.s, (Inhalation Hazard Zone D)		
	124		124	124	3307 . 124	<u> </u>		123	123	52		
	3307		3307	3307	3307	3308		3308	3308	3308		
										1	ing H	j.

(1.0+km (7.0+m)

(3.3 ml)

5.2 km

(2500 ft)

800 m

2.5 km (1,6 m)

(0,3 mi)

0,5 km

(300 fl)

100 m

Compressed gas, poisonous, oxidizing, corrosive, n.o.s. Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)

124

54

(B.0 m)

9.6 KW

(2.8 mi)

4,5 km

(2500 ft)

800 m

(0.7円)

(0,2 mi) 1.1 km

0,3 km

(200 ft)

90 m

Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)

124

2.4 km (1.5 m)

0.9 km

(500 ft)

150 m

(0.2 m)

(0.1 ml) 0.3 km

0.1 km

(100 ft)

30 m

Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)

124

(12m)

. ₽

(0.5 mi)

0.7 km

(300 ft)

100 m

0.2 km (0.1 mi)

(0.1 mi)

0.1 km

(100 ft)

30 m

Compressed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)

42

(е.о ш)

Ę. 96

(2.8 ml)

4.5 km

800 m (2500 ft)

0.3 km (0.2 ml) 1.1 km (0.7 ml)

60 m (200 ft)

Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)

124

1.0+ km (7.9-m)

(3.3 mi)

5.2 km

(2500 ft)

800 m

(1.6 mi)

2.5 km

(0,3 mi)

0.5 km

(300 ft)

100 m

Compressed gas, loxic, oxidizing, corrosive, n.o.s. Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)

124 124

(1.2 m)

(0.5 mi)

0.7 km

(300 ft)

100 E

(E)

0.2 km

(0.1 m)

0.1 km

(100 ft)

30 m

Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)

1

2.4 km (1,5 ml)

0.9 km

(500 ft)

150 m

0,3 KM

(0.1 m)

0.1 km

(100 ft)

30 m

Compressed gas, toxic, flammable, corrosive, n.o.s. (inhafation Hazard Zone C)

119

(0.8 ml) 2.6 km (1.6 ml)

1,2 km

(e00 ft)

200 m

(0.2 m)

0.4 P

(0.1 mi)

0.1 km

(100 ft)

99 E

Compressed gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)

119

		≥	88	- 8	의목	3500	7 2 2	목으리	5=	
	Ì	Guide NA	124	124	124	124	124	124 124		
	į		1			İ				
	<u> </u>	으운	3306	3306	3307	3307	3307	3307		
Tays-	22h				1					
				i ak	e viete je					
									Hatta (teste)	
		NIGHT Kilometers (Miles)		(5.6 m)	(3.0 т.)	(1.6 ml)	(1.2 m)	(6.3 m)	(1.6 ml)	
kages	je	NIGHT meters (47.7		100		9	144 1746	-5-44
ll bac	동	lome		9.0 km	4.8 Km	2.6 km	1.9 km	10.2 km km	₽ 97	
S sy sms	Then PROTECT persons Downwind during		10.00		10.41.719.			Second Second		
PIL mar	. E	Mile		(1.9 ml)	(1.4 mi)	(0.6 ml)	(0.5 ml)	(3.5 ml)	(0.8 ml)	
or fro	Derso	DAY Kilometers (Miles)								
SHIPPER SPILLS ICKAGE or from many		Ν		3.0 km	2.2 km	0.9 km	0.7 кт	5.6 km	1.2 km	
N D(STA) (PES) LARGE SPILLS Lange package of from narry small packages)			-							
Silik	First ISOLATE	(Feet)		500 m (1500 fl)	(1250 ft)	(500 ft)	(500 ft)	1000 m (3000 ft)	(900 ft)	
(From	E OS	Meters		E	400 m	150 m	150 m	E	200 m	
	.5							100	82	
VE ARTHETALETA		DAY NIGHT	ļ	(0.4 ml) 2.5 km (1.5 ml)	1.0 кт (0.6 т.)	0.4 km (0.3 ml)	(0.15m)	SAL É	(0.2 ml)	
e a s	l girin	NIGHT			- 9-	 -		0		
e la la	Then PROTECT Dersons Downwind during	Slome		2.5 Kg		7.4 Km	0.2 km	38 km (2.4 m)	0.4 ₽	
LS K fron	Then PROTECT ns Downwind	les)	110.533	ii dana P						
SPIL SPIL	F Sinosi	DAY sters (Mi		(0.4	(0.2 ml)	(0.1 ml)	(0.1 mi)	(0.6 ml)	(0.1 ml)	
SMALL SPILI	2	D D		0.6 km	0.2 km	0.1 km	0.1 km	1.0 km	0.1 km	
Electrical SN 2007 (8.15) SMALL SPILLS package or small leak from										
CINTRINSULS SOLD AT ION WARD STOCKED TO SOLD SOLD SOLD SPILLS SMALL SPILLS SMALL SPILLS From a small package of small back from a bring package)	First ISOLATE in all Directions	Meters (Feet)		(300 ft)	(100 lt)	(100 ft)	(100 ft)	(500 ft)	(100 ft)	
n a sr	First ISOLATE	ters (100 m						
(From	<u> </u>	ĕ		5	30 ⊞	30 m	30 ш	150 m	30 m	
- n			sive,	₹	, <u>6</u>	ច្	í í	0.S.	. B.	
<u>.</u>		¥	COLLOS	Zone	Zone	Zone	Zone	quefied gas, poisonous, laminable, corrosive, n.o.s. quefied gas, poisonous, lammable, corrosive, n.o.s.	ve, n.	
	l	IEB.	toxic	toxic. o.s. lazard	toxic. o.s. lazarc	toxic D.S. lazard	toxic o.s. lazaro	poisc corros poisc corros azarc	poisc corros lazaro	
		JF M/	d gas,	d gas, ve, n.	d gas, ve, nu tion H	d gas, ve. n., tion F	d gas, ve, n.	d gas, able, c d gas, able, c	d gas,	
		Guide NAME OF MATERIAL	Liquefied gas, toxic, corrosive, n.o.s.	Liqueffed gas, toxic, corrosive, n.o.s. (inhalation Hazard Zone A)	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone B)	Liquefied gas, toxic; corroslve, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, toxic, corrosive, n.o.s. (Inhalation Hazard Zone D)	iquefied gas, poisonous, flammable, corrosive, n.o.s. Iquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)	Liquefied gas, poisonous, flammable; corrosive, n.o.s. (Inhalation Hazard Zone B)	
		ž e	1	500	_ ··	5 00	٥٥ لڌ		3-0	
		Guid	52	123	52	52	123	119	119	
= <u></u>		o §	3308	3308	3308	3308	3308	3309	3309	
	<u> </u>									

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				- (E)						
va1#2=1	ges)	5	NIGHT	(1.5 mi)	(1.2 ml)	(7.9+ m)	(6.0 m)	(13.m)	(1.2 m)	
	mall packa	ECT	Kiometers (Miles)	24km (1.5 m)	<u>\$</u>	11.0+km (7,0+m)	8.6 8.6	2.4 km	1.9 Ki	
	LARGE SPILLS ckage or from many s	Then PROTECT persons Downwind during	DAY Kilometers (Miles)	(0.6 mi)	(0.5 ml)	(3.3 mi)	(2.8 mi)	(0.6 mi)	(0.5 ml)	·
- 7	LARGE SPILLS (From a large package or from many small packages)	90	Kilomete	0.9 km	0.7 km	5.2 km	4.5 km	my 6:0	0.7 кт	
energen inderen isografion anderse ascaracionas energias	m a large p	First ISOLATE in all Directions	s (Feet)	(500 ft)	(300 ft)	(2500 ft)	(2500 ft)	(500 ft)	(300 ft)	
	(Fro	OSI	Meters	150 m	100 m	m 009	ш 008	150 m	100 m	
	package)	ing	iHT rs (Miles)	(0.2 m)	(0.1 m)	2.5.km (1.6 m)	(0.7 ml)	(0.2 m)	(0.14 (E.V.)	
)H()	ж a large	Then PROTECT persons Downwind during	Me NIGHT RIGHT RIGHT RIGHT RIGHT (Miles)	03km (02m)	0.2 km (0.1 m)	2.5.km	E I	0.3 km	0.2 km	
e GMV	SPILLS all leak fro	PRO Sons Dov	DAY Kilometers (Miles)	(0.1 mi)	(0.1 ml)	(0.3 ml)	(0.2 mi)	(0.1 mi)	(0.1 ті)	
	SMALL SPILLS From a small package or small leak from a large package)	100	DAY Kilometers (0.1 km	0.1 km	0.5 km	0.3 km	0.1 km	0.1 km	*
95	S small pack	First ISOLATE In all Directions	(Feet)	(100 ft)	(100 ft)	(300 ft)	(200 ft)	(100 ft)	(100 ft)	
III (N)	(From a s	ISOI ISOI	Meters	E 86	30 m	100 m	ш 09	30 m	30 m	
ENERGY CONTRACT	-		NAME OF MATERIAL	Compressed gas, loxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)	Compressed gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)	Liqueried gas, poisonous, oxidizing, n.o.s. Liqueried gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone A)	Liquefled gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone B)	Liquefied gas, poisonous, oxidizing, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, poisonous, oxidizing, n.o.s. (inhalation Hazard Zone D)	
			Guide	124	124	124	124	124	124	
			으흔	3306	3306	3307	3307	3307	3307	•

	8	g	8 8	86	6	8	2 2	9	. 01	
	3306	3309	3309	3303	3308	3308	3310	3310	3310	
									lage se	ķ
			e di S						: //av: /. : 12- / /:	
	(1,6m)	(1.5ml)			ì	((.5 m))	e l	(1.0 m)		
12			(1.2 m)	(e3 m)	(mg))		((,2,m)			
	2.6 km	2.4 km	1.9 Km	10.2 km	2.6 km	2.4 km	1.9 km	1.6 km		
			l))) () L		
	(0.8 m)	(0.6 ml)	(0.5 ml)	(3.5 m))	(0.8 ml)	(0.6 ml)	(0.5 ml)	(0.3 ml)		
	1.2 кт	0.9 km	0.7 km	5.6 km	1.2 km	0.9 km	0.7 кт	0.5 km		
										Œ
	t 009	(500 ft)	(300 ft)	(3000)	(1009)	(500 ft)	(300 ft)	(200 ft)		
	200 m	150 m	100 m	1000 m	200 ∓	150 m	100 m	m 09		3000000
	(0.2 m)	(0.2 ml)	(O.1 m.)	ŧ		2 m.)	(0.1m)	ê.		yosou
				(2)	- C F	0		9		
1472 415	0.4 kg	0.3 P	0.2 km	3.8 kg	0.4 kr	0.3 kr	0.2 km	0.2 kg		
	(0.1 mi)	(0.1 mi)	(0.1 mt)	(0.6 ml)	(0.1 m) 0.4 km ((0.2 m)	(0.1 ml) 0.3 km (0.2 ml)	(0.1 mi)	(0.1 m) 0.2 km (0.1 m)		B) CE
	0.1 km	0.1 km	0.1 km	150 m (500 tt) 1.0 km (0.6 m) 3.8 km. (2.4 m) 1000 m (3000 ft)	0.1 km	0.1 km	0.1 km	0.1 km		The first of States are be larged to emain at most and before the
	(100 ft)	(100 lt)	(100 ft)	(t) 00	(100 ft)	(100 ft)	(100 ff)	(100 ft)		Selice
				(2						
	30 ₪	30 m	30 ш	150	30 m	30 m	30 m	30 11		
	Insecticide gas, potsonous, flammable, n.o.s. (Inhalation Hazard Zone B)	Insecticide gas, poisonous, fammable, n.o.s. (Inhaiation Hazard Zone C)	Insecticide gas, poisonous, fammable, n.o.s. (Inhalation Hazard Zone D)	Insecticite gas, toxic, flammable, n.o.s. Insecticite gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone A)	Insecticide gas, toxic, fammable, n.o.s. (Inhalation Hazard Zone B)	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone C)	Insecticide gas, toxic, flammable, n.o.s. (Inhalation Hazard Zone D)	Chlorosilanes, polsonous, corrosive, n.o.s. (when spilled in water) Chlorosilanes, toxic, corrosive, n.o.s. (when spilled in water)		
	119	£	119	119	13	€	119	156 156		
	3355	3355	3355	3355	3355	3355	3355	3361		-
				144 S. 156				F-12-12-13	STATE OF STREET	1/2

1909 119 Liqueled gas, policitorus. 30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.2 m) 150 m (500 ft) 0.3 km (0.5 m) 2.4 km (1.5 m) 150 m (500 ft) 1.2 km (0.5 m) 1.5 km (1.5 m) 1.5 km (0.5 m) 1.5 km (1.5 m) 1.5 km (0.5 m) 1.5 km (1.5 m) 1.5 km (1.5 m) 1.5 km (0.5 m) 1.5 km (1.5 km) 1.5 km (1.	119 Liquelled gas, polsorrous, 110 Liquelled gas, polsorrous, 110 Liquelled gas, toxic, 110 Liquelled gas, tox		G WE							
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Higher Harmonian Higher Harm	Handleid gas, polsonous, Handleid gas, polso	(0.6 mi)	(0.5 ml)	(3.5 m)	(0.8 mi)	(0.6 mi)	(0.5 mi)	(3.3 m))	(2.8 m)	(0.6 mi)
Sage 119 Liquelled gas, poisonous, Italian Liquelled gas, pois	Sage 119 Liquelled gas, poisonous, Italian Ita	0.9 km	0.7 km	5.6 km	1.2 P	0.9 km	0,7 km	5.2 km	4.5 km	0.9 km
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119 Liquelled gas, polsomous, lammable, conseste, no.s. 1389 119 Liquelled gas, polsomous, lammable, conseste, no.s. 13809 119 Liquelled gas, polsomous, no.s. 13809 119 Liquelled gas, toxic, lammable, consiste, no.s. 150 m 13809 119 Liquelled gas, toxic, lammable, consiste, no.s. 150 m 16mmable, consiste, no.s. 150 m 16mmable, consiste, no.s. 150 m 119 Liquelled gas, toxic, lammable, consiste, no.s. 16mmable, n	119 Liquelled gas, polsomous, flammable, conseste, no.s.	0.1 km	0,1 km	1.0 km	0.1 km	0.1 km	0.1 km	0.5 km	0.3 km	0.1 km
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3309 3309 3309 3309 3309 3310 3310	3309 3309 3309 3309 3310 3310	Liquetied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, poisonous, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)	Liquefied gas, toxic, flammable, corrosive, n.o.s. Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)	Liquefied gas, toxic, fammable, corrosive, n.o.s. (Inhaletion Hazard Zone B)	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, toxic, flammable, corrosive, n.o.s. (Inhalation Hazard Zone D)	Liqueffed gas, polsonous, oxidizing, corrosive, n.o.s. Liqueffed gas, polsonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)	Liquefied gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)	Liquefted gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)
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	125gp:559	3309	3309	3308	3309	3308	3308	3310	3310	3310

	i Ligje	30 <u>2</u>						
		vi ek ji tal	(8)					
	ckages)	uring	DAY (Miles) Kilometers (Miles)	n (1.0 m)	n (2.5 m)	(OZ m)	m (3.0 m)	
	S y small pa	Then PROTECT s Downwind d	Klom	11.8 km	4.0 km	0.7. km	4.7.km	
	LARGE SPILLS ckage or from many	Then PROTECT persons Downwind during	DAY ters (Mites	(0,3 m))	(1.6 m)	(0,3 ш)	(1.3 mi)	
Æ.	LARGE ackage or	ь.	Kilome	0,5 km	2,5 km	0.5 km	2.0 km	
THE ISOLANDA AND PRODECTIVE ARTHOUGH DEFENCES	LARGE SPILLS (From a large package or from many small packages)	First ISOLATE in all Directions	Meters (Feet)	(200 ft)	(600 ft)	(200 ft)	(500 ft)	
(e) Krojaj		ISO ISO	Meters	m 09	200 m	60 m	150 m	. ,
INE A	SMALL SPILLS From a small package or small leak from a large package)	rring	DAY INGHT	(O.1 m.)	0.4 km (0.3 ml) 1.2 km (0.3 ml)	((O,1m))	(0.3 m) 1.4 km (0.9 m)	36 255 20E
)-i	om a larg	Then PROTECT persons Downwind during	Kilomet	(0.1 m) 0.2 km (0.1 m)	1.2 km	(0.1 m) 0.2 km (0,1 m)	2. 2. E	
NAME :	SPILLS nall leak fi	PRC PRC ersons Do	DAY ters (Miles)		(0.3 mi)			
	SMALL SPILLS kage or small leak for		Kilomet	0.1 km		0.1 km	0.5 km	
	small pac	First ISOLATE In all Directions	Meters (Feet)	(100 ft)	(100 ft)	(100 ft)	(200 ft)	
	(From a	SS	Meter	30 H	90 E	30 m	E 09	<u>-</u>
Episkel			RÍAL	hlorosilanes, poisonous, corrosive, flammable, n.o.s. (when spilled in water) hlorosilanes, toxic, corrosive, flammable, n.o.s. (when spilled in water)	Poisonous by inhalation liquid, n.o.s. (Inhalation Hazard Zone A) Toxic by Inhalation liquid, n.o.s. (Inhalation Hazard Zone A)	olsonous by in o.s. (Inhalation liquid, n.o.s. (Inhalation Hazard Zone B) foxic by inhalation liquid, n.o.s. (Inhalation Hazard Zone B)	alation 9, n.o.s. rd Zone A) h liquid, rd Zone A)	(
			Guide NAME OF MATERIAL	Chlorosilanes, poisonous, corrosive, flammable, n.c. (when spilled in water). Chlorosilanes, toxic, corrosive, flammable, n.c (when spilled in water)	Poisonous by inhalation liquid, n.o.s. (Inhalation Hazard Zone A) Toxic by inhalation liquid, n.o. (Inhalation Hazard Zone A) (Inhalation Hazard Zone A)	Poisonous by infailing in 2.8. (Inhalation liquid, n.o.s. (Inhalation Hazard Zone B) Toxic by inhalation liquid, n.o. (Inhalation Hazard Zone B)	Poisonous by Inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A) Toxic by inhalation liquid, flammable, n.o.s. (Inhalation Hazard Zone A) (Inhalation Hazard Zone A)	
			e NAME	0 - 0 -	Poisor inhal (Inha Toxic t	Poisor inhal (Inha Toxic t	22-54-	
			Guid	155	स्	151 151	151 151	
			₽Ś	3362	3381	3382 3382	3383 3383	

TABLE CNTICAL SOUNT CNTICAL SOUNT CNTICAL						Property.						
ARGE SPILLS age of from many s age of from many s PROT PROT PROT DAY Kilomalers (Miles) 7 km (0.5 mi) 7 km (0.5 mi) 7 km (0.5 mi) 6 km (3.5 mi)				Ten 1975-670	4.4mm (1.5 ml)	5 km (6.0 ml))+km (7.0+m)	9 km (1.2 ml)	NIGHT ometers (Miles)	T d during	packages)	
Common C	<i>≅,</i> 1 .			.156.9627.577			1111/00/2-11/1344	Mary 14E		PROTECTS Downwin	JILLS many small	
LLS axis from a large package and from a large package by POTECT First PROTECT First PROTECT (From a large package) Then Then I are package and the package by POTECT in all Directions for in all Directions (Fact) [1] [1] [2] [2] [2] [3] [3] [4] [4] [4] [4] [4] [4] [4] [4] [4] [4			1					1	DAY Kilometers	berso	ARGE Stage or from	<i>T</i>
LLS And a large package) Then Then Then Then Then Then Then The			-			(2500 ft)			(Feet)	irst LATE irections	m a large pa	
LLS Then ra large package) Then ra large package) Then ra large package) Then random r		1000 m	150 m	100 m	150 m	m 008	B00 m		Weters	ISO In all D	(Fro	
LLS Then Then Then Then Then Then Then Then	. / . * 5 7)	(2.4 ml)	(0.1 m)	(0:1 m)	(0.2 m)	(0.7 ml)	(1.6 m)	(0.1 m)	SHT rs (Miles)	ring	package)	
3 mi) 1 mi)			0.2 km	0.2 km	0.3 km	\$ 5	2.5 km	02 km		hen TECT wnwind du	om a large	01101
SPI Small k Small	,	(0.6 ml)	(0.1 ml)	(0.1 ml)	(0.1 ml)		(0.3 ті)	(0.1 ml)	DAY Kilometers (Miles)	PRC PRC ersons Dov	SMALL SPILLS kage or small leak fr	
0.5 km 0.1 km 0.5 km 0.		1.0 km	0.1 km	0.1 km	0.1 km	0,3 km		0.1 km	D. Kilomete	ă	MALL age or sn	
Form (100 ft) So m (100 ft)		(500 ft)	(1,00 ft)	(1001)	(100 ft)	(200 ft)		(100 ft)	(Feet)	rst _ATE rections	small pack	95 74
From a say we have a say m too m too m say m say m too m say		150 m	30 m	30 m	30 m	E0 m	ш 001	30 m	Meters	ISO In all Di	(From a	
Guide NAME OF MATERIAL 124 Liquefeed gas, poisonous, oxidizing, correstle, n.o.s. (Inhalation Hazard Zone D) 124 Liquefeed gas, toxic, oxidelare, n.o.s. (Inhalation Hazard Zone D) 124 Liquefeed gas, toxic, oxidelare, n.o.s. (Inhalation Hazard Zone D) 125 Liquefeed gas, toxic, oxidelare, n.o.s. (Inhalation Hazard Zone D) 126 Liquefeed gas, toxic, oxidizing, correstle, n.o.s. (Inhalation Hazard Zone D) 127 Liquefeed gas, toxic, oxidizing, correstle, n.o.s. (Inhalation Hazard Zone D) 128 Ammonia solution, with more than 50% Ammona 119 Insecticle gas, poisonous, flammable n.o.s. (Inhalation Hazard Zone D) 125 Ammonia solution, with more than 50% Ammona 119 Insecticle gas, poisonous, flammable n.o.s. (Inhalation Hazard Zone D) 128 Ammonia solution, with more than 50% Ammona 119 Insecticle gas, poisonous, flammable n.o.s. (Inhalation Hazard Zone A) (Inhalation Hazard Zone A) (Inhalation Hazard Zone A) (Inhalation Hazard Zone A)		Insecticide gas, poisonous, flammable, n.o.s. Insecticide gas, poisonous, flammable, n.o.s. (inhalation Hazard Zone A)	Ammonia solution, with more than 50% Ammonia	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone D)	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone C)	Liquefied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone B)	Liquelied gas, toxic, oxidizing, corrosive, n.o.s. Liquelied gas, toxic, oxidizing, corrosive, n.o.s. (Inhalation Hazard Zone A)	Liquefied gas, poisonous, oxidizing, comosive, n.o.s. (Inhalation Hazard Zone D)	NAME OF MATERIAL			ENBIAN.
Guide 124 124 119 119 119		£ £ ~	125	124	124	124	124	124	Guide			
3310 3310 3310 3310 3310 3310 3310 3310		3355	3318	3310	3310	3310	3310	3310	9 S			

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- 454			* * ·	<u> </u>							Page 386
	N 1997		√" ± 3	/			e feetja	opt of s			
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ATANANYA	(2.5)	7.4 km (4.6 m)		ő				1.7			
		7.4 전		0.8 km (0.5 m		<u>\$</u>		0.8 kh			
		(2.8 m)		(0.3 ml)		1,3 m)		(0.3 ml)			
	ļ					2.0 km . (1.3 m)					Ì
	·	4.5 km		0.5 km				0.5 km		ļ .	
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		0.5 km (0.6 ml) 2.0 km (1.2 ml) 400 m (1250 ft)		₩ 09		#091 ₩		E 09			
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1000 2004 2004	64E	2.0		0.2	. 744	4 .		2			
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			71				To i				
	Poisonous by inhalation liquid, flammable, corrosive, n.o.s.	(in letation hazard 2018 A) oxic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone A)	Polsonous by Inhalation liquid, flammable, corrosive, n.o.s.	(Inhalation Hazard Zone B) xic by inhalation liquid, flammable, corrosive, n.o.s. (Inhalation Hazard Zone B)	Poisonous by inhalation liquid, water-reactive, flammable, n.o.s. (inhalation Hazard	Zone A) Toxic by inhalation liquid, water reactive, fiammable, n.o.s.	Poisonous by inhalation liquid,	water-reactive, reminable, n.o.s. (thhalatton Hazard Zone B) foxic by inhalation liquid, water	reactive, flammable, n.o.s. (inhalation Hazard Zone B)		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	inhalati	ation liq	Inhalatl	tazard ation liq corrosiv tazard	inhalati ve, flam ation Ha	ation liq	inhalati	ve, ram atlon Ha ation liq	nmable lazard		
	mable, o	In the factor of the Taxard Control of Toxic by inhalation liquid, flammable, corrosive, n. (Inhalation Hazard Zone)	nable,	(Inhalation Hazard Zone Toxic by inhalation liquid, flammable, corrosive, n. (Inhalation Hazard Zone	oisonous by inhalation lique water-reactive, flammable n.o.s. (inhalation Hazard	Zone A) xxlc by inhalation liquid, wa ceactive, flammable, n.o.s.	yd snor	water-reactive, renimatie, n.o.s. (inhalation Hazard Zone B) oxic by inhalation liquid, wa	tive, flar station F		
	Poisor	lan Internation	Polsor		Poisor wate n.o.s	Zone A) Toxic by in	Poiso	water-res n.o.s. (Inl Zone B) Toxic by in	reac (Inhi		
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	3488	3488	3489	3489	3430	3490	3491	3491			
	5.05		Verte						95 =		Page 6872

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(0.3 mi)

0.5 km

(200 ft)

E00 m

0.2 km (0.1 m)

(0.1 mi)

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(1001)

30 m

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(2.5 m)

4.0 km

(1.6 ml)

2.5 km

200 m (600 ft)

(08m)

(0.3 mi) 1.2 km

(100 ft) 0.4 km

30 m

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Pelsonous by inhalation inqui, simmable, no.s. (Inhalation Hazard Zone) (Inhalation Hazard Zone) (Inhalation Hazard Zone B) (Inhalation Hazard Zone B) Pelsonous by Inhalation Hazard Zone Middle Maraton Hazard Zone A) (Inhalation Hazard Zone A)

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0.5 km (0.3 ml)

(0.2 mi)

0.3 km

(100 ft)

89 E

(0.1 mi) 0.2 km (0.1 m)

0.1 km

(100 ft)

30 m

Poisonous by inhalation flqui, oxiding, nos. (Inhalation Hazard Zone A) Took by Inhalation Hazard Zone A) Took by Inhalation Hazard Zone A) (Inhalation Hazard Zone A) Poisonous by inhalation Hazard Zone B) (Inhalation Hazard Zone B) Took by Inhalation Hazard Zone B) (Inhalation Hazard Zone B) (Inhalation Hazard Zone B) (Inhalation Hazard Zone B)

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-4.0 km (2.5 ml)

(1.6 ml)

200 m (600 ft) 2.5 km

30 m (100 ft) 0.4 km (0.3 m) 1.2 km (0.8 m)

0,7 km (0,4 m)

(0,3 mi)

0.5 km

(200 ft)

Ю ш

30 m (100 ft) 0.1 km (0.1 mi) 0.2 km (0.1 mi)

Poisonous by inhalation ilquid, water-reactive, n.o.s. (Inhalation Hazard Zone B) Toxic by inhalation Ilquid, water-reactive, n.o.s. (Inhalation Hazard Zone B)

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			Guide	ž ž	451 451	153	35		
			₽Š	3389	3390	3456 3456 3456	3461		
	Page	<u> </u>	÷ Ž						
	LARGE SPILLS (From a large package or from many small packages)	Then PROTECT persons Downwind during	Kilometers (Miles)	7.8km (4.6m)	0.8 km (0.5 m)	0.7 km (0.4 ml)	(lm.).0)	0,4 кт (0.2 т)	V1: #Fd: 7
	LARGE SPILLS ckage or from many:	Then PROTECT sersons Downwind	DAY Kilometers (Miles)	(2.8 m))	(0.3 ml)	(0.3 ml)	(0.1 ml)	(0.1 ml)	
Æ	LARGI package or	ď	Kilome	4.5 km	0.5 km	0.5 km	0,1 km	0.1 km	·
ON DISTORICES	om a large	First ISOLATE in all Directions	Meters (Feet)	400 m (1250 ft)	(200 ft)	(200 ft)	(100 ft)	(100 ft)	
8	(Fr	IS I	Mete	400 m	e0 m	ш 09	30 m	30 m	
	SMALL SPILLS From a small package or small leak from a large package)	Then PROTECT persons Downwind during	Me NIGHT Klometers (Miles)	2.0 km (1.2 m)	0.2 km (0.1 km)	0.2 km (0.1 ml)	0.1 (m (0.1 m)	0.21km (0.1 ml)	
9	SMALL SPILLS skage or small leak from	Then PROTECT rsons Downwind	DAY Kilometers (Miles)	(0.6 m)	(0.1 m)	(0.1 ml)	(0.1 m)	(0.1 mi)	
L Million	MALL age or sm	96	Kilomete	0.9 km	D,2 km	0.1 km	0.1 km	0.1 km	
<u> </u>	Small pack	First ISOLATE in all Directions	Meters (Feet)	(300 ft)	30 m (100 lt) 0.2 km (0.1 ml)	(100 ft) 0.1 km	(100 ft)	(100 ft)	
	(From а	ISO:	Meters	100 m	. E	30 m	30 m	30 ш	
SOERS TO SELECTION OF THE SECRETARY OF T		-	Guide NAME OF MATERIAL	Poisonous by inhalation liquid, corrostve, flammable, n.o.s. (Inhalation Hazard Zone A) Toxic by Inhalation liquid, corrostve, flammable, n.o.s. (Inhalation Hazard Zone A)	Poisonous by inhalation liquid, corroshe, flammable, n.o.s. (Inhalation Hazard Zone B) Toxic by Inhalation iquid, corroshe, flammable, n.o.s. (Inhalation Hazard Zone B)	Petroleum sour crude oil, flammable, poisonous Petroleum sour crude oil, flammable, toxic	Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-fissile or fissile-excepted (when spilled in water)	Adsorbed gas, poisonous, n.o.s. Adsorbed gas, poisonous, n.o.s. (Inhalation hazard zone A)	
			Guide	131	£ £	臣 臣	166	£ £	
			ΘŚ	3492	3493	3494	3507	3512 3512	

	es)	_	-(T)	(1.6 m)	(00.4 m)	(0.8 m	(E 8:	(0.8 ml)	
	LARGE SPILLS (From a large package or from many small packages)	Then PROTECT persons Downwind during	NIGHT Kilometers (Miles)	2.6 km	0.6 km	1.2 km (0.8 ml)	2.8 km	1.3 km	
	LARGE SPILLS ckage or from many a	Then PROTECT arsons Downwing	DAY Kilometers (Miles)	(0.9 ml)	(0.3 mi)	(0.2 mi)	(0.5 ml)	(0.3 ml)	
42	LARGE nackage or	ā.	Kilome	1.5 km	0,5 km	0.3 km	0.8 km	0.4 km	
THERE IN INTERAL ISSUESTION AND PROPERTIES IN THE MINISTER OF THE WINDERSTROME	om a large p	First ISOLATE In all Directions	s (Feet)	(1000 ft)	(200 ft)	(200 ft)	(1000 ft)	(200 ft)	
		ISC ISC	Meters	300 m	E 09	E 09	300 m	E 09	
No. Miller	package)	ring	MINIGHT Kilometers (Miles)	(0.4 m)	(0. E	(m. 0)	(0.4.ml)	E O	
) (0)[3](0)	om a large	Then PROTECT as Downwind du	NIGHT KIOMETERS (₩./20 		0.2 km	(0.1 m) 0.5 km	(0.1 ml) 0.2 km	Single State of the Section 1
	SPILLS all leak fro	Then PROTECT persons Downwind during	DAY Kilometers (Miles)	(0.2 m)	(0.1 ml)	(0.1 ml)	(0.1 mi)	(0.1 ml)	
Vigillet V	SMALL SPILLS kage or small leak fr	80	D/ Kilomete	0.3 km	0.1 km	0.1 km	0.2 km	0.1 km	
	, SMALL SPILLS From a small package or small leak from a large package)	First ISOLATE in all Directions	Meters (Feet)	(200 ft)	(100 ft)	(100 ft)	(200 ft)	(100 ft)	
	(From a	ISO IO lle ri	Meters	E 09	30 m	30 m	ш 09	30 m	
			NAME OF MATERIAL	Poisonous by inhalation liquid, cornosive, n.o.s. (Inhalation Hazard Zone A) Toxto by Inhalation. Ilquid, cornosive, n.o.s. (Inhalation Hazard Zone A)	Poisonous by inhalation liquid, corrosive, n.o.s. (inhalation Hazard Zone B) Toxic by inhalation liquid, corrosive, n.o.s. (inhalation Hazard Zone B)	CN (when used as a weapon)	Nitrosylsulfuric acid, solid (when spilled in water) Nitrosylsulphuric acid, solid (when spilled in water)	Aluminum alkył halides, solid (when spilled in water)	
			Guide	\$ \$	室 章	153	157 157	35	
			으충	3389	3390	3416	3456 3456	3461	

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0.4 km (0.2 m)	(0.1 m)	0.2 m)	Q., 18m (0.1 m)	
(0.1 mi)	(0.1 ml)	(0.1 m)	(0.1 m)	
0.1 km	6.1 km	P. 1.0	0.1 km	
(100 ft)	(100 ft)	(100 fl)	(100 ft)	
30 m	8 E	30 m	30 m	
0.2 km (0.1 mi)	0.1km (0.1mm), 0.1km/m (0.1mm)	0.2 km (0.1 m)	(0.1 m) (0.1 km) (0.1 km)	
(0.1 ml)	(0.1 m)	(0.1 mi)	(0.1 m)	
 0.1 km		6.1 kř	0.1 km	
(100 ft)	(100 ft)	(100 ft)	(100 ft)	
30 m	8 E	8 E	. E . 8	
Adsorbed gas, toxic, oxidizing, n.o.s. Adsorbed gas, toxic, oxidizing, n.o.s, (Inhalallon hazard zone A)	Adsorbed gas, toxic, oxidizing, nos. (Imalation hazard zone B) nos. (Imalation hazard hos. (Imalation hazard zone C) Adsorbed gas, toxic, oxidizing, Adsorbed gas, toxic, oxidizing, nos. (Imalation hazard zone D) and the page oxidizing zone D)	Adsorbed gas, polsonous, corrosive, n.o.s. Adsorbed gas, polsonous, corrosive, n.o.s. (inhalation hazard zone A)	Adsorbed gas, polsonous, oorrosive, roas, (Inhalation hazard zone B) Adsorbed gas, polsonous, oorrosive, ros, (Inhalation hazard zone C) Adsorbed gas, polsonous, oorrosive, roas, (Inhalation hazard zone C) Adsorbed gas, polsonous, oorrosive, roas, (Inhalation hazard zone D)	
571 571	ET ET ET	話 琵	E71 E71	
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				1.1		
	E O	02 E	- Î	(0,2 m)		
61.0 1 5 5 1	. .	0.4 km	01 km	0.4 km (0.2 m	<u>2</u>	C1620-1-10
	(0.1 m)	(0.1 m)	(0.1 m)	(0.1 mi)	(0.1 mj)	
	0.1 km	0.1 km	0.1 km	0.1 km (0.1 mi)	0.1 km	
	(100 ft)	(100 ft)	(100 ft)	(100 ft)	(100 ft)	
	30 m	30 m	30 ш	30 m	# 08	
	Ē.	(m)	(O-1)	0.1 km (0.1 mi) 0.2 km (0.1 mi)	(0.1m)	
	<u>5</u>	₽ 20	(0.1 m) 0.1 km, (0.1 m)	0.2 km	(0.1 ml) -0.1 km (0.1 ml)	
	(0.1 ml)	0.1 km (0.1 mi) 0.2 km	(0.1 mi)	(0.1 mi)	(0.1 ml)	
	0.1 Pž	0.1 km	0.1 km	0.1 km	0.1 km	
	(100 ft)	(100 ft)	(100 ft)	(100 ft)	(100 ft)	
	30 m	30 m	30 ш	30 E	30 m	
	Adsorbed gas, poisonous, n.a.s. (Inhalation hazard zone B) Adsorbed gas, poisonous, n.a.s. (Inhalation hazard zone C) Adsorbed gas, poisonous, n.a.s. (Inhalation hazard zone C)	Adsorbed gas, toxlc, n.o.s. Adsorbed gas, toxic, n.o.s. (Inhalation hazard zone A)	Adsorbed gas, loxic, n.o.s. (Inhelation hazard zone B) Adsorbed gas, loxic, n.o.s. (Inhelation hazard zone C) Adsorbed gas, loxic, n.o.s. (Inhelation hazard zone C)	Adsorbed gas, poisonous, flammable, n.o.s. Adsorbed gas, poisonous, flammable, n.o.s. (Inhaletton hazard zone A)	Adsorbed gas, poisonous, lammable, nos, (liviatiton hazard zone B) Adsorbed gas, poisonous, farmable, nos, (liviatiton hazard zone C) Adsorbed gas, poisonous, farmable, nos, (liviatiton hazard zone C) Isammable, nos, (liviatiton hazard zone D)	
	57 57 ET	ជជ	173 173 173	話 話	E71 E71 E71	
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			<u>9</u>	351	3514	351	3514	3514	3515	3515	3515	3515	3515	
	Page	32(9)								3- 1 -1		5		
					Mercille t. Januaria		<u>長**+-**</u>		G 02					
	LARGE SPILLS From a large package or from many small packages)	Then PROTECT persons Downwind during	DAY NIGHT NIGHT KIOmeters (Miles)		0.4 km (0.2 m)		0.1 km (0.1 ml)			0,4'km (0,2 ml))(-) (
	LARGE SPILLS ckage or from many	PRC PRC persons Do	DAY eters (Miles		(0.1 ml)		(0.1 ml)			(0.1 ml)				
	LARG package o		Kilom		0.1 km		0.1 km			0.1 km				
) Julian	om a large	First ISOLATE In all Directions	Meters (Feet)		(100 ft)		(100 ft)			(100 ft)	,			
alejiki.	F.	SI II	Mete		30 m		30 m			30 m				
nd. President in indicate (Standyndon in 1988) de Garectare de den i bestalle (Standyndon).	SMALL SPILLS From a small package or small leak from a large package)	Then PROTECT persons Downwind during	DAY Kilometers (Miles) Kilometers (Miles)		m (0.1m) 0.2 km (0.1m)		(100 tt) 0.1 km (0.1 m) 0.1 km (0.1 m)	-1 +1 *2 *2 ¢		п (0.1 m) 0.2 km (0.1 m)			Če	
	SMAL age or		Kilon	ļ	9.1 kg		0.1k			.e. Ž				
ામિમિમિલી ફિલ્	From a small pac	First ISOLATE in all Directions	Meters (Feet)		30 m (100 ft)		30 m (100 ft)			30 m (100 ft)				
			Guide NAME OF MATERIAL	Adsorbed gas, toxic, corrosive,	⋖	Adsorbed gas, toxic, corrosive, n.o.s. (Inhalation hazard	•	zone C, Adsorbed gas, toxic, corrosive, n.o.s. (Inhalation hazard zone D)	Adsorbed gas, polsonous,	₹ -				
	,			6 173	173	6 173	173	173	571 71	57 T				
	Aug e	57 is	₽Š	3516	3516	3516	3516	3516	3517	3517			₹ <u>5</u> ,4,4,	

								.**		11 25 21				
	From a large package or from many small packages)	ECT wind during	NIGHT Klometers (Miles)		0.4 km (0.2 mj)		0 1 km			0.4 km (0.2 m)		0.1.km (0.1.m.)		(
ABGE SDILS	from many sr	Then PROTECT persons Downwind during	DAY Kilometers (Miles)		(0.1 m)		O III			(0.1 m)		(E.		
ABC:	ackage or	a	Kilome		0.1 km		Ę	į		0.1 km		0.1 km		
	m a large p	First ISOLATE in all Directions	Meters (Feat)		(100 ft)		(100 ff)			(100 ft)		(100 #)		
L		ISO I	Meters		30 m		E S			30 H		8 8		
SMALL SPILLS	From a small package or small leak from a large package)	Then PROTECT persons Downwind during	Kilometers (Miles)		(0.1 m) 0.2 km (0.1 m)		0.1 km (0.1 mil)			0.1 km (0.1 m) 0.2 km (0.1 m)		0.1 km (0.1 ml)		
SHIRSHIRS	small leak fro	Th PRO Persons Dow	DAY Kilometers (Miles)		(0.1 ml)		(0.1 m) 0.1 km			(0.1 m)		(0.1 ml)		
SMA	kage or s		Kilome		0.1 km		D.1 MA					0.1 k		L
	small pac	First ISOLATE in all Directions	Meters (Feet)		(100 fl)		(100 fi)			(100 ft)		(100 ft)		
	(From a	in all D	Meters		30 m		96 E	,		30 H		30 H		L
		_	Guide NAME OF MATERIAL	Adsorbed gas, toxic,	nammable, n.o.s. Adsorbed gas, toxic, flammable, n.o.s. (Inhalation hazard zone A)	Adsorbed gas, toxic, flammable, n.o.s. (Inhalation	hazard zone B) Adsorbed gas, toxic, flammable n.o.s. (Inhalation	hazard zone C) Adsorbed gas, toxlo, flammable, n.o.s. (Inhalation hazard zone D)	Adsorbed gas, poisonous,	oxdizing, n.o.s. Adsorbed gas, poisonous, oxidizing, n.o.s. (Inhalation hazard zone A)	Adsorbed gas, poisonous, oxidizing, n.o.s. (Inhalation	nazard zone b) Adsorbed gas, poisonous, oxidizing, n.o.s. (Inhalation	hazard zone C) Adsorbed gas, poisonous, oxidizing, n.o.s. (Inhalation hazard zone D)	
			Guide	173	173	ŧ	5	話	173	173	173	57	57	
			으홍	3514	3514	3514	3514	3514	3515	3515	3515	3515	3515	

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			Ê				(0.2:m)			41.6	(0.1 mi)		· 保証機	(02 ml)			
			£	950.y			0.4 km				0.1 km (0			Ť			
Jan.		<u> 16,57. Q</u>	- - -	1461		MAC)			Ca-	304s_2			flori	.0. P.	51 <u>2142</u>	-	
			(0.1 mi)		İ		(0.1 ml)				(0.1 mi)			(0.1 mi)			-
			0.1 km				0,1 km				0.1 km			0.1 km			
			(100 fl)				(100 ft)				(100 ft)			(100 ft)			Z 2 2 2 2 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
			8 E				30 H		-		8 8			8 E		Asia Reside	Melinie (ge
		(4) /1. 	E		ricial. De soe		(0.1 (m.)	24			(0.1 (0.1			<u>6</u>	7.1.086 96.4.66		de la la la la la la la la la la la la la
			: €				(0.1 mi) 0.2 km			2,000	<u>5</u>			65 F			
			(0.1 mi)				(0.1 mi)				(0.1 mi) 0.1 km			(0.1 m)))
			0.1 km				0.1 km				0.1 km			0.1 kg		egivilizate	
			(1001)				(100 fl)				(100 ft)			(100 ft)			aleign a
			8 E			<u>,,,</u>	30 m		41		30 m	oi		30 E			0
	,suor	e, n.o.s. cone B) nous.	e, 11.0.S.	, suor	e, n.o.s. cone D)	Adsorbed gas, toxic, flammable,	corrosive, r.o.s. Adsorbed gas, toxic, flammable,	i i	Adsorbed gas, toxic, flammable.	corrosive, n.o.s. (inhalation hazard zone B) Adsorbed gas, toxic, flammable,	nalation	nazard zone C) 4dsorbed gas, toxic, flammable. corrosive, n.o.s. (Inhalation hazard zone D)	snor.	nous, n.o.s. one A)		74	
	Adsorbed gas, poisonous,	flammable, corrosive, n.o.s (Inhalation hazard zone B) dsorbed gas, poisonous.	lammable, corrosive, n.o.s.	(Illinalaulon nazaru zone U.) idsorbed gas, poisonous,	lammable, corrosive, n.o.s. Inhalalion hazard zone D)	Jas, toxic,	corrosive, il.o.s dsorbed gas, toxic, flamma corrocive, o.o.e. (Inhalation	ne A)	Jas, toxic,	corrosive, n.o.s. (inhalation hazard zone B) dsorbed gas. toxic. flammal	corrosive, n.o.s. (Inhalation	nazard zone U) dsorbed gas, toxic, flammal corrosive, n.o.s. (Inhalation hazard zone D)	Adsorbed gas, poisonous, oxidizing, corrosive, n.o.s	Adsorbed gas, poisonous, oxidizing, corrosive, n.o.s. (Inhalation hazard zone A)			
	dsorbed c	flammable (Inhalation dsorbed c	flammabl	dsorbed g	flammabl (Inhalatio	dsorbed g	dsorbed gas, to	hazard zone A)	dsorbed	corrosive, hazard zo dsorbed c	corrosive	nazard zone C) dsorbed gas, tol corrosive, n.o.s. hazard zone D)	dsorbed g	dsorbed g exidizing, (Inhalation			
	173 #	. 24		173		173	173		173 4	173	•	173	173	571			
	3517	3517		3517		3517	3517		3517	3517		3517	3518	3518			
				200		-					-			ෆ ·			Ę
		¥.											15,		Rage×	ře:	
			ê	è				Cu Cu	i (îu		î î				Prige-Y		
	m (0,2 mi)	(m, (0,1 m))	回(0.4元)	п (0.3 п.)	m (0,3mi)		(2.8 mt)	m (0.3 m)	ст (0,2 m)	ന്ന (0.2 ന)	m ((1.5 m))				k ge		
	0.4 km	0.1 F	0.2 km	0.4 km	0.5 km		4.4 km (2.8 mi)	0,5 km	ШX 8:10	0.3 km) 24 Cl ((5 m)				k ge		
		Ę		#			(m (2.8 ml)	(0.2 ml) 0.5 km		MARKET STATES	(0.8 ml) 2.4 km ((1.5 ml)						
	т) 0.4 кт	(E)	1 m) 0.2 km	I m) 0.4 km	ті) 0.5кт		ml) 4.4 km (2.8 ml)	т) 0,5 кт	ш) 0.3 хт	0.2 km (0.2 mi) 0.3 km	1,3 km (0,8 ml)	V de					
	(0,1 ml) 0,4 km	km (0.1 m) 0.1 km	(0.1 ml) 0.2 km	(0.1 ml) 0.4 Km	(0.1 ml) 0.5 km		(0.7 ml) 4.4 km (2.8 ml)	(0.2 ml) 0.5 km	(0.2 ml) 0.3 km	(0.2 mi) 0.3 km	(300 ft) 1,3 km (0,8 ml)						
	0.1 km (0.1 mi) 0.4 km	30 m (100 ft) 0.1 km (0.1 ml) 0.1 km	30 m (100 ft) 0.1 km (0.1 m) 0.2 km	30 m (100 ft) 0.1 km (0.1 ml) 0.4 km	30 m (100 ft) 0.2 km (0.1 ml) 0.5 km		200 m (600 ft) 1,2 km (0,7 ml) 4,4 km (2,8 ml)	30 m (100 ft) 0.4 km (0.2 ml) 0.5 km	30 m (100 ft) 0.2 km (0.2 ml) 0.3 km	30 m (100 ft) 0.2 km (0.2 mi) 0.3 km	100 m (300 ft) 1,3 km (0.8 ml)						
	30 m (100 ft) 0,1 km (0,1 ml) 0,4 km	(0.1 m) 30 m (100 ft) 0.1 km (0.1 ml) 0.11km	(0,1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	(100 ft) 0.1 km (0.1 ml) 0.4 km	(100 ft) 0.2 km (0.1 m) 0.5 km		(600 ft) 1.2 km (0.7 ml) 4.4 km (2.8 ml)	30 m (100 ft) 0.4 km (0.2 ml) 0.5 km	30 m (100 ft) 0.2 km (0.2 ml) 0.3 km	30 m (100 ft) 0.2 km (0.2 mi) 0.3 km	100 m (300 ft) 1,3 km (0.8 ml)						
	10.2 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.4 km	O. Ser (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.51 km	0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	02 km (0.1 ml) 30 m (100 ft) 0.1 km (0.1 ml) 0.4 km	0.1 km (0.1 m) 30 m (100 ft) 0.2 km (0.1 m) 0.5 km		0.2 km (0,1 ml) 200 m (600 ft) 1.2 km (0.7 ml) 4.4 km (2.8 ml)	0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 9.5 km	0.0 km (0.1 ml) 30 m (100 lt) 0.2 km (0.2 ml) 0.3 km	0.1.4m (0.1.ml) 30 m (100 ft) 0.2 km (0.2 ml) 0.3 km	0.8 km (0.4 m) 100 m (300 ft) 1.3 km (0.8 m)						
	30 m (100 ft) 0,1 km (0,1 ml) 0,4 km	(0.1 m) (0.1 m) (0.1 m) 30 m (100 t) 0.1 km (0.1 m) (0.1 m)	(0,1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	(0.1 m) (0.2 km) (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) (0.4 km)	(0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.2 km (0.1 ml) 0.5 km		(0,1 m)) 200 m (600 ft) 1.2 km (0,7 m) 4.4 km (2.8 m)	30 m (100 ft) 0.4 km (0.2 ml) 0.5 km	30 m (100 ft) 0.2 km (0.2 ml) 0.3 km	(0.1 mi) 0.11 cm (0.1 ml) 30 m (100 ft) 0.2 km (0.2 mi) 0.3 km	(0.2 mt) 0.8 km (0.4 mt) 100 m (300 ft) 1.3 km (0.8 mt)						The state of the same of the s
	10.2 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.4 km	0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km	0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	02 km (0.1 ml) 30 m (100 ft) 0.1 km (0.1 ml) 0.4 km	0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 t) 0.2 km (0.1 m) 0.5 km		0.2 km (0,1 ml) 200 m (600 ft) 1.2 km (0.7 ml) 4.4 km (2.8 ml)	0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 0.5 km	0.1 km (0.1 m) 00 km (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) 0.3 km	0.1 km (0.1 mi) 0.1 km (0.2 mi) 30 m (100 ft) 0.2 km (0.2 mi) 0.3 km	0.2 km (0.2 ml) [0.6 km] (0.4 ml) 100 m (300 fl) 1,3 km (0.8 ml)						The state of the same of the s
	(0.1 m) [0.2 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.4 km	(0.1 m) (0.1 m) (0.1 m) 30 m (100 t) 0.1 km (0.1 m) (0.1 m)	(0.1 m) (0.1 m) (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	(0.1 m) (0.2 km) (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) (0.4 km)	(0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.2 km (0.1 ml) 0.5 km		(0.1 m) 0.2 km (0.1 m) 200 m (600 tt) 1.2 km (0.7 m) 4.4 km (2.8 m)	(0.1 m) 0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 0.5 km	(0.1 m) [0.1 km] (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) [0.3 km]	(0.1 mi) 0.11 cm (0.1 ml) 30 m (100 ft) 0.2 km (0.2 mi) 0.3 km	(0.2 mt) 0.8 km (0.4 mt) 100 m (300 ft) 1.3 km (0.8 mt)						The state of the same of the s
	0.1 km (0.1 m) [0.2 km, [0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.94 km	0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km	0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100 fl) 0.1 km (0.1 m) 0.4 km	0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 t) 0.2 km (0.1 m) 0.5 km		30m (10011) 0.1 km (0.1 m) 0.2 km (0.1 m) 200 m (60011) 1.2 km (0.7 m) 4.4 km (2.8 m)	0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 0.5 km	0.1 km (0.1 m) 00 km (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) 0.3 km	0.1 km (0.1 mi) 0.1 km (0.2 mi) 30 m (100 ft) 0.2 km (0.2 mi) 0.3 km	0.2 km (0.2 ml) [0.6 km] (0.4 ml) 100 m (300 fl) 1,3 km (0.8 ml)						The state of the same of the s
	30 m (100ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100ft) 0.1 km (0.1 m) 0.4 km	30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.3 km	30 m (100 ft) 0.1 km (0.1 m) (0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	30 m (100 ft) 0.1 km (0.1 m) [0.2 km] (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) [0.4 km]	30 m (100 tt) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 tt) 0.2 km (0.1 m) 0.5 km		30m (10011) 0.1 km (0.1 m) 0.2 km (0.1 m) 200 m (60011) 1.2 km (0.7 m) 4.4 km (2.8 m)	30 m (100 ft) 0.1 km (0.1 m) (0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 0.5 km	30 m (100 ft) 0.1 km (0.1 m) (0.1 m) (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) (0.3 km)	(100 ft) 0.1 km (0.1 ml) 0.1.km (0.1 ml) 30 m (100 ft) 0.2 km (0.2 ml) 0.3 km	(100 ft) 0.2 km (0.2 mt) (0.4 mt) 100 m (300 ft) 1.3 km (0.8 mt)						
	30 m (100ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100ft) 0.1 km (0.1 m) 0.4 km	30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.3 km	30 m (100 ft) 0.1 km (0.1 m) (0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	30 m (100 ft) 0.1 km (0.1 m) [0.2 km] (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) [0.4 km]	30 m (100 tt) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 tt) 0.2 km (0.1 m) 0.5 km		30m (10011) 0.1 km (0.1 m) 0.2 km (0.1 m) 200 m (60011) 1.2 km (0.7 m) 4.4 km (2.8 m)	30 m (100 ft) 0.1 km (0.1 m) (0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 0.5 km	30 m (100 ft) 0.1 km (0.1 m) (0.1 m) (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) (0.3 km)	30 m (1001f) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) 0.3 km	30 m (100 ft) 0.2 km (0.2 mt) 0.6 km (0.4 mt) 100 m (300 ft) 1.3 km (0.8 mt)				See Next Page for Table of Water-Reactive Materials Which Produce Toxic Gases		The state of the same of the s
	30 m (100ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100ft) 0.1 km (0.1 m) 0.4 km	30 m (100 ft) 0.1 km (0.1 m) 0.3 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.3 km	30 m (100 ft) 0.1 km (0.1 m) (0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	30 m (100 ft) 0.1 km (0.1 m) [0.2 km] (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) [0.4 km]	30 m (100 tt) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 tt) 0.2 km (0.1 m) 0.5 km	In water)	30m (10011) 0.1 km (0.1 m) 0.2 km (0.1 m) 200 m (60011) 1.2 km (0.7 m) 4.4 km (2.8 m)	30 m (100 ft) 0.1 km (0.1 m) (0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 0.5 km	30 m (100 ft) 0.1 km (0.1 m) (0.1 m) (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) (0.3 km)	30 m (1001f) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.2 km (0.2 m) 0.3 km	30 m (100 ft) 0.2 km (0.2 mt) 0.6 km (0.4 mt) 100 m (300 ft) 1.3 km (0.8 mt)						The state of the same of the s
	(100 ft) 0.1 km (0.1 m) [0.2 km] (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.04 km	s pertialluoride, 30 m (100 t) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km (0.1 m) 0.1 km	(100 ft) 0.1 km (0.1 m) 0.1 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.2 km	(100 ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100 ft) 0.1 km (0.1 m) 0.4 km	la, 30 m (1001f) 0.1 km (0.1 m) 0.5 km (0.1 m) 0.5 km	- 1	(10011) 0.1 km (0.1 m) 0.2 km (0.1 m) 200 m (600 ll) 1.2 km (0.7 m) 4.4 km (2.8 m)	(100 ft) 0.1 km (0.1 m) 0.2 km (0.1 m) 30 m (100 ft) 0.4 km (0.2 m) 9.5 km	(100 ft) 0.1 km (0.1 mi) (0,1 mi) 30 m (100 ft) 0.2 km (0.2 mi) (0.3 km)	(100 ft) 0.1 km (0.1 ml) 0.1.km (0.1 ml) 30 m (100 ft) 0.2 km (0.2 ml) 0.3 km	(100 ft) 0.2 km (0.2 mt) (0.4 mt) 100 m (300 ft) 1.3 km (0.8 mt)						The state of the same of the s

				LAMION SMALL	SMALL SPILLS	Name Bolewigon and Propagatory active designation	Medicin in		E ARGE	ABGE SPILLS	
		(From a s	small pack	age or sm	all leak fr	From a small package or small leak from a large package)		om a large p	ackage or	from marry	(From a large package or from many small packages)
		ISOL ISOL	First ISOLATE In all Directions	ed	T PRO rsons Dow	Then PROTECT persons Downwind during)SI E	First ISOLATE In all Directions	*	Then PROTEC ersons Downwin	Then PROTECT persons Downwind during
Guide NAME OF MATERIAL	ATERIAL	Meters	(Feet)	D. Kilomete	DAY Kilometers (Miles)	MIGHT Kilometers (Miles)		rs (Feet)	Kilomet	DAY Kilometers (Miles)	NIGHT Klometers (Miles)
Adsorbed go oxidizing, oxidizing, (inhalation (inhalation) (inhalation) (inhalation) (inhalation) (inhalation) (inhalation) (inhalation) (inhalation)	Adsorbed gas, poisonous, coviding, correstive, no.s. (Inhabition hazard zone B) Adsorbed gas, poisonous, coviding, correstive, no.s. (Inhabition hazard zone C) Adsorbed gas, poisonous, coviding, correstive, no.s. (Inhabition hazard zone C) Adsorbed gas, poisonous, coviding, correstive, no.s. (Inhabition hazard zone D)	90 E	(100 ft)	0.1 km	(0.1 ml)	(0.1 m) (0.1 m)	90e	(100 fl)	0.1 km	(0.1 加)	0.1 km (0.1 m)
173 Adsorbed gas, too corrosive, n.o.s. 173 Adsorbed gas, too corrosive, n.o.s. hazard zone A)	Adsorbed gas, toxic, oxidizing, corrosive, n.o.s. Adsorbed gas, toxic, oxidizing, corrosive, n.o.s. (inhalation hazard zone A)	30 m	(100 ft)	0.1 km		(0.1 m) 0.2 km (0.1 m)	30 ш	(100 ft)	0.1 km	(0.1 ml)	0.4 km (0.2 ml)
Adsorbed gas, too corrosive, n.o.s. hazard zone B) 173 Adsorbed n.o.s. oronosive, n.o.s. hazard zone C) 173 Adsorbed gas, (or corrosive, n.o.s. corrosive, n.o.s. hazard zone D)	vdsorbed gas, torki, oxidizing, corrosile, noxa, lihalation hazard zone B) desperatore gas, torki, oxidizing, corrosile, nox. (Ilmalation hazard zone C) desperatore gas, loxe, oxidizing, corrosile, nox. (Ilmalation hazard zone C) corrosile, nox. (Ilmalation hazard zone D)	30 m	(100 ft)		0.1 km (0.1 ml)	O. Lean Confirm)	■ 00 - 1 ■ 00 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	(100 ft)	- 0.1 Ri	(0.1 m)	0.1 km (0.1 km)
173 Boron triff	Boron trifluoride, adsorbed	30 m	(100 ft)	0.1 km	(0.1 mi)	(0.1 ml) 0.1 km (0,1 ml)	30 H	(100 ft)	0.1 km	(0.1 mi)	0:1 km (0,1 mi)
173 Chlorine, adsorbed	adsorbed	30 m	(100 ft)	0.1 km	(0.1 ml)	10:1 km (0.1 ml)	30 m	(100 ft)	0.1 km	(0.1 ml)	0.1 km (0.1 m)
173 Sillcon te	Silicon tetrafluoride, adsorbed	30 m	(100 ft)	0.1 km	(0.1 페)	0.1 km (0.1 m)	.) 30 m	(100 ft)	0.1 km	(0.1 ml)	0.1 km (0.1 m)
173 Arsine, adsorbed	dsorbed	30 m	(100 ft)	0.1 km	(0.1 mi)	(0.1 ті) ∥02 кті (0.1 ті)	30 m	(100 ft)	0.1 km	(0.1 m)	0.4 km (0.2 m)
	_						2.3				

HOW TO USE TABLE 2 - WATER-REACTIVE MATERIALS WHICH PRODUCE TOXIC GASES

Table 2 lists materials which produce large amounts of Toxic Inhalation Hazard (TIH) (PIH in the US) gases when spilled in water and identifies the TIH gases produced.

The materials are listed by ID number order.

These Water Reactive materials are easily identified in Table 1 as their name is immediately followed by "(when spilled in water)".

Note 1: Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (UN1746), Thionyl chloride (UN1836); etc.). In these instances, two entries are provided in Table 1 for land-based and water-based spills. If the Water Reactive material is NOT a TIH and this material is NOT spilled in water, Table 1 and Table 2 do NOT apply and safety distances will be found within the appropriate orange guide.

Note 2: Materials classified as a Division 4.3 are substances that, on contact with water, are liable to become spontaneously FLAMMABLE or give off FLAMMABLE or sometimes TOXIC gases in dangerous quantities. For the purpose of this table, water reactive materials are materials that generate substantial quantities of TOXIC gases rapidly after a spill into water. Therefore, a material classified as a Division 4.3 will not always be included in Table 2.

TABLES ANATION OF THE PROPERTY

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) (PIH in the US) Gas(es) When Spilled in Water

ID No.	Guide No.	Name of Material	·	TIH Gas(es) Produced
1162	155	Dimethyldichlorosilane		HCI
1183	139	Ethyldichlorosilane		HCI
1196	155	Ethyltrichlorosilane		HCI
1242	139	Methyldichlorosilane		HCI
1250	155	Methyltrichlorosilane		HCl
1295	139	Trichlorosilane		HCI
1298	155	Trimethylchlorosilane		HCI
1305	155P	Vinyltrichlorosilane		HCI .
1305	155P	Vinyltrichlorosilane, stabilized	÷	HCI
1340	139	Phosphorus pentasulfide, free from yellow	and white Phosphorus	H ₂ S
1340	139	Phosphorus pentasulphide, free from yello	w and white Phosphorus	s H ₂ S
1360	139	Calcium phosphide		PH ₃
1384	135	Sodium dithionite		H,S SO,
1384	135	Sodium hydrosulfite		H,S SO,
1384	135	Sodium hydrosulphite		H,S SO,
1397	139	Aluminum phosphide		PH ₃
1419	139	Magnesium aluminum phosphide		PH ₃
1432	139	Sodium phosphide		PH ₃
1541	155	Acetone cyanohydrin, stabilized		HCN
1680	157	Potassium cyanide		HCN
1680	157	Potassium cyanide, solid		HCN
1689	157	Sodium cyanide		HCN
1689	157	Sodium cyanide, solid		HCN
nemica Br,	ıl Symb	ols for TIH (PIH in the US) Gases: ne HF Hydrogen flu	oride NO, N	itrogen dioxide
CI,	Chlor	ne HI Hydrogen iod	lide PH. P	hosphine
HBr HCI HCN	Hydro	gen bromide H ₂ S Hydrogen su gen chloride H ₂ S Hydrogen su gen cyanide NH, Ammonia		ulfur dioxide ulphur dioxide

ិ បន្ទេចព្រឹម្សាធិប្រជុំព្រឹក្តាស្រាស់ការការបានប្រជុំព្រឹក្សាស្រ្តាស់ការបានប្រជុំព្រឹក្សាស្រ្តាស់ការបានបានបានប

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TABBEZ-VATERBEAGIVENATERIALSWEIGHPRODUCTETOXIC GASES

Materials Which Produce Large Amounts of Toxic-by-inhalation (TIH) (PIH in the US) Gas(es) When Spilled in Water

ID No.	Guid No.	le Name of Mate	erial			TIH Gas(es) Produced
1777	137	Fluorosulfonic ac	id			HF
1777	137	Fluorosulphonic a	acid			HF
1781	156	Hexadecyltrichlor	rosilane			HĊI
1784	156	Hexyltrichlorosila	ne			HCI
1799	156	Nonyltrichlorosila	ine			HCI
1800	156	Octadecyltrichlor	osilane			HCI
1801	156	Octyltrichlorosila	ne			HC1
1804	156	Phenyltrichlorosil	ane			HCI
1806	137	Phosphorus pent	achloride			HCI
1808	137	Phosphorus tribro	omide			HBr
1809	137	Phosphorus trich	loride			HCI
1810	137	Phosphorus oxyc	hloride			HCI
1815	132	Propionyl chloride	e			HCI
1816	155	Propyltrichlorosila	ane			HCI
1818	157	Silicon tetrachfori	ide			HCI
1828	137	Sulfur chlorides				HCI SO, H,S
1828	137	Sulphur chlorides	3			HCI SO, H,S
1834	137	Sulfuryl chloride				HCI
1834	137	Sulphuryl chlorid	е			HCI
1836	137	Thionyl chloride				HCI SO₂
1838	137	Titanium tetrachl	oride			HCI
1898	156	Acetyl lodide				HI
1923	135	Calcium dithionite	e			H ₂ S SO ₂
hemica Br,	al Sym Bron	bols for TIH (PIH	in the US) Gases: Hydrogen fluoride	NO,	Nitrógen dioxíde
CI, HBr HCI HCN	Chio Hydi Hydi		HI H ₂ S H ₂ S NH ₃	Hydrogen iodide Hydrogen sulfide Hydrogen sulphide Ammonia	PH, SO, SO,	Phosphine Sulfur dioxide Sulphur dioxide

TARLES - WATERHIEAGINE MATERIA SAMICRUR ODUCE LOXAC CASES

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH)

(PIH in the US) Gas(es) When Spilled in Water

			(PIH in the US)	Gas	(es) When Spilled in	Water	
	ID No.	Guide No.	Name of Material		· .		TIH Gas(es) Produced
	1716	156	Acetyl bromide				HBr
	1717	155	Acetyl chloride				HCI
ı	1724	155	Allyltrichlorosilane, stabil	lized			HCI
ľ	1725	137	Aluminum bromide, anhy	/drous	t	2	HBr
ď	1726	137	Aluminum chloride, anhy	drous			HC!
į	1728	155	Amyltrichlorosilane				HCI
	1732	157	Antimony pentafluoride				HF
Ĭ	1741	125	Boron trichloride				HCI
ľ	1745	144	Bromine pentafluoride				HF Br ₂
ı	1746	144	Bromine trifluoride				HF Br ₂
i	1747	155	Butyltrichlorosilane				HCI
ı	1752	156	Chloroacetyl chloride				HCI
	1753	156	Chlorophenyltrichlorosila	ine			HCI
	1754	137	Chlorosulfonic acid (with	or wil	hout sulfur trioxide mixture)	HCt
	1754	137	Chlorosulphonic acid (wi	ith or v	vithout sulphur trioxide mixt	ure)	HCi
ė	1758	137	Chromium oxychloride				HCI
	1762	156	Cyclohexenyltrichlorosila	ne			HC1
	1763	156	Cyclohexyltrichlorosilane)			HCI
Ī	1765	156	Dichloroacetyl chloride				HCI
Ē	1766	156	Dichlorophenyltrichlorosi	ilane			HCI
ě	1767	155	Diethyldichlorosilane				HCI
	1769	156	Diphenyldichlorosilane				HCI
Ė	1771	156	Dodecyltrichlorosilane				HCI
			bols for TIH (PIH in the				Ma Produc
	Br ₂ Cl ₂ HBr HCI HCN	Chlo Hyd Hyd	rogen chloride H		Hydrogen fluoride Hydrogen iodide Hydrogen sultide Hydrogen sulphide Ammonia	NO ₂ PH ₃ SO ₂ SO ₂	Nitrogen dioxide Phosphine Sulfur dioxide Sulphur dioxide

TABUER-WAREHEREACHME MATHERMASSWARGHERCODUCE TOXICE MASSES

 $\mathcal{L}_{app}(\mathcal{U}) = 0$ in the third $\mathcal{L}_{app}(\mathcal{U})$ is a second contract of $\mathcal{L}_{app}(\mathcal{U})$.

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) (PIH in the US) Gas(es) When Spilled in Water

ID No.	Guid No.	e Name of Material				TIH Gas(es) Produced
1923	135	Calcium hydrosulfite			•	H ₂ S SO ₂
1923	135	Calcium hydrosulphite				H ₂ S SO ₂
1929	135	Potassium dithionite				H ₂ S SO ₂
1929	135	Potassium hydrosulfite				H ₂ S SO ₂
1929	135	Potassium hydrosulphite	е			H ₂ S SO ₂
1931	171	Zinc dithionite				H ₂ S SO ₂
1931	171	Zinc hydrosulfite				H ₂ S SO ₂
1931	171	Zinc hydrosulphite				H ₂ S SO ₂
2004	135	Magnesium diamide				NH ₃
2011	139	Magnesium phosphide				PH ₃
2012	139	Potassium phosphide				PH_3
2013	139	Strontium phosphide				PH ₃
2308	157	Nitrosylsulfuric acid, liqu	uid			NO ₂
2308	157	Nitrosylsulfuric acid, sol	lid			NO ₂
2308	157	Nitrosylsulphuric acid, li	iquid			NO ₂
2308	157	Nitrosylsulphuric acid, s	olid			NO ₂
2353	132	Butyryl chloride				HCI
2395	132	Isobutyryl chloride				HCI
2434	156	Dibenzyldichlorosilane				HCI
2435	156	Ethylphenyldichlorosilar	пе			HCI-
2437	156	Methylphenyldichlorosil	але	•		HCI
2495	144	lodine pentafluoride				HF
2691	137	Phosphorus pentabrom	ide	•		HBr
Chemi Br, Cl, HBr HCI	Br Ch Hy	forine } drogen bromide }	ie US) HF HI H ₂ S H ₃ S) Gases: Hydrogen fluorlde Hydrogen iodide Hydrogen sulfide Hydrogen sulphide	NO, PH, SO, SO,	Nitrogen dioxide Phosphine Sulfur dioxide Sulphur dioxide

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MEREST-ANMERREE CONNETTATEMENTE MATERIALISMA (INCLUSIO DE LE LOS MERESTES)

Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) (PIH in the US) Gas(es) When Spilled in Water

ID No.	Guid No.	e Name of Material	TIH Gas(es) Produced
2692	157	Boron tribromide	HBr
2806	138	Lithium nitride	NH ₃
2977	166	Radioactive material, Uranium hexafluoride, fissile	HF
2977	166	Uranium hexafluoride, radioactive material, fissile	HF
2978	166	Radioactive material, Uranium hexafluoride, non fissile or fissile-excepted	HF .
2978	166	Uranium hexafluoride, radioactive material, non tissile or fissile-excepted	HF
2985	155	Chlorosilanes, flammable, corrosive, n.o.s	HCI
2986	155	Chlorosilanes, corrosive, flammable, n.o.s	HCI
2987	156	Chlorosilanes, corrosive, n.o.s	HCI
2988	139	Chlorosilanes, water-reactive, flammable, corrosive, n.o.s.	HCI
3048	157	Aluminum phosphide pesticide	PH ₃
3049	138	Metal alkyl halides, water-reactive, n.o.s	HCI
3049	138	Metal aryl halides, water-reactive, n.o.s	HCl
3052	135	Aluminum alkyl halides, liquid	HCI
3052	135	Aluminum alkyl halides, solid	HCI
3361	156	Chlorosilanes, poisonous, corrosive, n.o.s.	HCI
3361	156	Chlorosilanes, toxic, corrosive, n.o.s.	HCI
3362	155	Chlorosilanes, poisonous, corrosive, flammable, n.o.s.	HCI
3362	155	Chlorosilanes, toxic, corrosive, flammable, n.o.s.	HCI
3456	157	Nitrosylsulfuric acid, solid	NO,
3456	157	Nitrosylsulphuric acid, solid	NO ₂
	al Sym	pols for TIH (PIH in the US) Gases:	
Br ₂ Cl ₂ HBr HCl HCN	Hydr		Nitrogen dioxide Phosphine Sulfur dioxide Sulphur dioxide

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NOTES

TABLES - WATER HER CONVENIENCE REPORTS WHICH HE CONTROL FROM CENTRAL SERVICE FOR THE PROPERTY OF THE PROPERTY Materials Which Produce Large Amounts of Toxic-by-Inhalation (TIH) (PIH in the US) Gas(es) When Spilled in Water

ID No.	Guide No.	Name of Material	TiH Gas(es) Produced
3461	135	Afuminum alkył halides, solid	HCI
3507	166	Uranium hexafluoride, radioactive material, excepted package, less than 0.1 kg per package, non-lissile or lissile excepted	HF
9191	143	Chlorine dioxide, hydrate, frozen	Cl ₂

Chemical Symbols for TIH (PIH in the US) Gases:

Br ₂ Cl ₂ HBr	Bromine Chlorine Hydrogen bromide	HF Hl H,S	Hydrogen fluoride Hydrogen iodide Hydrogen sulfide	NO ₂ PH ₃ SO,	Nitrogen dioxide Phosphine Sulfur dioxide
HCI	Hydrogen chłoride	H ₂ S	Hydrogen sułphide	so,	Sulphur dioxide
HCN	Hydrogen cyanide	NH,	Ammonia		

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HOW TO USE TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR LARGE SPILLS FOR DIFFERENT QUANTITIES OF SIX COMMONTIH (PIH in the US) GASES

Table 3 lists Toxic Inhalation Hazard materials that may be more commonly encountered.

The selected materials are:

- · Ammonia, anhydrous (UN1005)
- Chlorine (UN1017)

Page sheet

- · Ethylene oxide (UN1040)
- Hydrogen chloride, anhydrous (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- · Hydrogen fluoride, anhydrous (UN1052)
- · Sulfur dioxide/Sulphur dioxide (UN1079)

The materials are presented in alphabetical order and provide Initial Isolation and Protective Action Distances FOR LARGE SPILLS (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day time and night time situations and different wind speeds.

Estimating Wind Speed from Environmental Clues

mph	km/h	Wind Description	Specifications
< 6	< 10	Low wind	Wind felt on face; leaves rustle; ordinary vane moved by wind
6 - 12	10 - 20	Moderate wind	Raises dust, loose paper; small branches are moved
> 12	> 20	High wind	Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty

7	TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR LARGE SPILLS FOR DIFFERENT QUANTITIES OF SIX COMMONTIH (PIH In the US) GASES	SOLATI	ON AND	PROTE OF \$	CTIVE A	ACTION	OTECTIVE ACTION DISTANCES FOR LARGE OF SIX COMMON TIH (PIH in the US) GASES	CES FO	IR LAR(S) GASI	SE SPILLS F	IOR DI	FFEREN	TOUAN	TITIES
		First ISOLATE	First ISOLATE				Ψ	en PROT	ECT pers	Then PROTECT persons Downwind during	during			
					-	۵	DAY					NGHT		
				Low wind (< 6 mph = < 10 km/h)	_ow wind < 6 mph = < 10 km/h)	Modera (5-12) 10 - 20	Moderate wind (5-12 mph = 10 - 20 km/h)	High wind (> 12 mph = > 20 km/h)	wind nph =	Low wind (< 6 mph = < 10 km/h)		Moderate wind (5-12 mph = 10 - 20 km/h)		High wind > 12 mph = > 20 km/h)
		Meters	(Feet)	Ē	(Miles)	Ē	(Miles)	<u>\$</u>	(Miles)	km (Miles)	_	km (Miles)	(Se	n (Miles)
	TRANSPORT CONTAINER	UN100	5 Amm	onia, a	nhydro	ous: La	UN1005 Ammonia, anhydrous: Large Spills	IIS						
	Raintankoar	300	(1000)	1.7	(1.1)	<u></u>	(0.8)	0,1	(9.0)	4.3 (2.7)		2.3 (1.)	(1.4)	3 (0.8)
High	ignway tank truck or trailer	150	(200)	6.0	(9.0)	0.5	(0.3)	0.4	(0.3)	2.0 (1.3)		0.8 (0.5)		0.6 (0.4)
Ag	Agricultural nurse tank	09	(200)	0.5	(0.3)	0.3	(0.2)	0.3	(0.2)	1.3 (0.8)		0.3 (0.2)		0.3 (0.2)
W	Multiple small cylinders	90	(100)	0.3	(0.2)	0,2	(0.1)	0.1	(0.1)	0,7 (0.5	(0.5)	0.3 (0.2)		0.2 (0.1)
) A	TRANSPORT	UN101	UN1017 Chlorine: Large Spills	ine: La	arge Sp	silis								
	Reil bank cer	1000	(3000)	9.9	(6.2)	6,4	(4.0)	5.1	(3.2)	+11	(+2)	9.0		6.7 (4.2)
	Highway lenk truck or trailer	009	(2000)	5.8	(3.6)	3.4	(2.1)	2.9	(1.8)	6.7 (4.3)	1.249	5.0 (3.1)		4.1 (2.5)
	Multiple ton cylinders	300	(1000)	2.1	(1.3)	1.3	(0.8)	6.	(0.6)	4.0 (2.5)	-	2.4		1.3 (0.8)
美化草	Multiple small cylinders or single ton cylinder	150	(200)	1.5	(6.0)	8.0	(0.5)	0.5	(0.3)	2.9 (1.8)	AMERIC	1.3 (0.3)	970 (6	5 (0.4)
ne 356														-

TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR LARGE SPILLS FOR DIFFERENT QUANTITIES OF SIX COMMON TH (PIH in the US) GASES	SOLATIO	N AND	PROTE OF (CTIVE A	MONT	OTECTIVE ACTION DISTANCES FOR LARGE OF SIX COMMON TH (PIH in the US) GASES	ICES FC in the U	S) GASI	GE SPILLS FC ES	OR DIFFE	RENT Q	UANTITIES	i vis tan
-	First ISOLATE	LATE				Ţ,	en PROT	ECT per	Then PROTECT persons Downwind during	uring			
		2			DAY	<u>.</u>			2) 1	Ž	NIGHT		
		·	Low wind (< 6 mph = < 10 km/h)	wind ph = mh)	Moderate wind (6-12 mph = 10 - 20 km/h)	le wind nph = km/h)	E 4 4	High wind (> 12 mph = > 20 km/h)	Low wind (< 6 mph = < 10 km/h)	Moder (6-12 10 - 20	Moderate wind (5-12 mph = 10 - 20 km/h)	High wind (> 12 mph = > 20 km/h)	
	Meters	(Feet)	5	(Miles)	<u>5</u>	(Miles)	Ē	(Miles)	km (Miles)	S	(Miles)	km (Miles)	
TRANSPORT	UN1052 Hydrogen fluoride, anhydrous: Large Spills	Hydre	ogen fl	uoride,	anhyo	lrous: 1	Large (Spills					
Pail tank car	400	(1250)	3.1	(1.9)	6.	(12)	1,6	(1.0)	6.1	62	(0.3)	(1.3) 1.9 (1.2)	
Highway tank truck or trailer	200	(200)	6,1	(1.2)	1.0	(0.7)	6.0	(0.6)	3.4 (22)	9.1	(0°1)	(9'0) 6'0	
Multiple small cylinders or single ion cylinder	100	(300)	8.0	(0.5)	9.0	(0.2)	6.3	(0.2)	(0:L) 9:L	0.5	(E-0)	0.3 (0.2)	
TRANSPORT	UN1079 Sulfur dioxide/Sulphur dioxide: Large Spills	Sulfu	r dioxi	de/Sulp	ohur di	oxide:	Large	Spills					
Sail tenk car	1000	(3000)	ŧ	(+/_)	ŧ	(£)	0''	(4,4)	(£2); +11	114	(±)	9.8 (6.1)	
Highway tank truck or trailer	1000	(3000)	≠	(1+2)	5.8	(3.6)	2.0	(3.1)	(+2) +11	8.0	(2:0)	6.1 (3.8)	
Multiple ton cylinders	200	(1200)	5.2	(3.2)	2,4	(1,5)	1.8	(1.1)	7.5 (4.7)	4.0	(2.5)	(1.7)	
Multiple small cylinders or single ton cylinder	200	(009)	3.1	(1.9)	5,1	(6.0)	1,1	(0.7)	(5.6) 8.2	2,4	(1.5)	1.5 (0.9)	
-													

s S				P = €	(Miles)		(0.5)	(0.3)	(0.1)		(1.5)	(0.5)	(0,1)	(0-1)	
UANTITIE	1			High wind (> 12 mph = > 20 km/h)	Ę		(5.0) 8.0	(0.3)	3		23	0.8	0.2	0.2	
DIFFERENT OF		5	NIGHT	Moderate wind (6-12 mph = 10 - 20 km/h)	km (Miles)		(2.1) 1.4 (0.9)	0.7	0.3 (0.2)	!	3.4 (2.1)	(60) 51	(2:0) 6:0	0,3 (0.2)	
ILLS FOR		Then PROTECT persons Downwind during		Low wind (< 6 mph = < 10 km/h)	(Miles)	,		(6.1)	(9:0)	,	(6.2)	(24)	(2.0)	0.9 (0.6)	
GE SP	3	rsons Do		7.5E	Ē		3.3	2.0	3	Snill	6.6	- C		0.9	
OR LAR	5	TECT per		High wind > 12 mph = > 20 km/h)	(Miles)		(0.5)	(0.3)	(0.1)	Spills	Ê	(0.4)	(0.1)	(0.1)	
ICES FC		en PRO1		1 4 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4 5 4 5	Ē		0.7	0.4	1.0	Large	1.7	9.0	1.0	0.1	
DISTAN		Ē	DAY	Moderate wind (6-12 mph = 10 - 20 km/h)	(Miles)	silis	(0,5)	(0.3)	(0.1)	drous:	(12)	(6.0)	(0.1)	(0.1)	
ACTION TMONT		.	2	Modera (6-12 r 10 - 20	Ē	rge Sp	8.0	0.5	0.2	anhy.	2.0	8.0	0.2	0.2	
OTECTIVE ACTION DISTANCES FOR LARGE OF SIX COMMONTH (PIH in the IIS) GASES	5			Low wind (< 6 mph = < 10 km/h)	(Miles)	UN1040 Ethylene oxide: Large Spills	(1.0)	(0.6)	(0.3)	UN1050 Hydrogen chloride, anhydrous: Large Spills UN2186 Hydrogen chloride, refrigerated liquid: Jarge Spills	(2.3)	(0.9)	(0.3)	(0.2)	
PROTE	5			Low (*6.1	5	(co aua)	1.6	6'0	4'0	ogen c	3,7	5,5	0.4	0.3	
ON AND		First ISOLATE in all Directions			(Feet)	O Ethy	(600)	(300)	(100)	0 Hydr	(1500)	(009)	(100)	(100)	
SOLATI		First IS			Meters	UN104	200	100	30	UN105	200	500	30	8	
TABLE 3 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES FOR LARGE SPILLS FOR DIFFERENT QUANTITIES OF SIX COMMONTH (PIH in the IS) RASES						TRANSPORT CONTAINER	Rall tank car	Highway tank truck or trailer	Multiple small cytinders	TRANSPORT	制度 Sell tank car	Highway tank truck or trailer	Muttiple ton cylinders	Multiple small cylinders or single fon cylinder	

ERG2016 USER'S GUIDE

The 2016 Emergency Response Guidebook (ERG2016) was developed jointly by Transport Canada (TC), the U.S. Department of Transportation (DOT), the Secretariat of Communications and Transport of Mexico (SCT) and with the collaboration of CIQUIME (Centro de Información Química para Emergencias) of Argentina, for use by fire lighters, police, and other emergency services personnel who may be the first to arrive at the scene of a transportation incident involving dangerous goods. It is primarily a guide to aid first responders in quickly identifying the specific or generic hazards of the material(s) involved in the incident, and protecting themselves and the general public during the initial response phase of the incident. For the purposes of this guidebook, the "initial response phase" is that period following arrival at the scene of an incident during which the presence and/or identification of dangerous goods is confirmed, protective actions and area securement are initiated, and assistance of qualified personnel is requested. It is not intended to provide information on the physical or chemical properties of dangerous goods.

This guidebook will assist responders in making initial decisions upon arriving at the scene of a dangerous goods incident. It should not be considered as a substitute for emergency response training, knowledge or sound judgment. ERG2016 does not address all possible circumstances that may be associated with a dangerous goods incident. It is primarily designed for use at a dangerous goods incident occurring on a highway or railroad. Be mindful that there may be limited value in its application at fixed facility locations.

ERG2016 incorporates dangerous goods lists from the most recent United Nations Recommendations as well as from other international and national regulations. Explosives are not listed individually by either proper shipping name or ID Number. They do, however, appear under the general heading "Explosives" on the first page of the ID Number index (yellow-bordered pages) and alphabetically in the Name of Material index (blue-bordered pages). Also, the letter (P) following the guide number in the yellow-bordered and blue-bordered pages identifies those materials which present a polymerization hazard under certain conditions, for example: Acrolein, stabilized 131P.

First responders at the scene of a dangerous goods incident should seek additional specific information about any material in question as soon as possible. The information received by contacting the appropriate emergency response agency, by calling the emergency response telephone number on the shipping document, or by consulting the information on or accompanying the shipping document, may be more specific and accurate than this guidebook in providing guidance for the materials involved.

BEFORE AN EMERGENCY – BECOME FAMILIAR WITH THIS GUIDEBOOK! In the U.S., according to the requirements of the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA, 29 CFR 1910.120), and regulations issued by the U.S. Environmental Protection Agency (EPA, 40 CFR Part 311), first responders must be trained regarding the use of this guidebook.

Guidebook Contents

1-Yellow-bordered pages: Index list of dangerous goods in numerical order of ID number. This section quickly identifies the guide to be consulted from the ID Number of the material involved. This list displays the 4-digit ID number of the material followed by its assigned emergency response guide and the material name.

For example:

ID No. 1090 GUIDE No. 127 Name of Material

2-Blue-bordered pages: Index list of dangerous goods in alphabetical order of material name. This section quickly identifies the guide to be consulted from the name of the material involved. This list displays the name of the material followed by its assigned emergency response guide and 4-digit ID number.

For example:

Name of Material Sulfuric acid GUIDE No.

ID No. 1830

3-Orange-bordered pages: This section is the most important section of the guidebook because it is where all safety recommendations are provided. It comprises a total of 63 individual guides, presented in a two-page format. Each guide provides safety recommendations and emergency response information to protect yourself and the public. The left-hand page provides safety-related information whereas the right-hand page provides emergency response guidance and activities for fire situations, spill or leak incidents and first aid. Each guide is designed to cover a group of materials which possess similar chemical and toxicological characteristics.

The guide title identifies the general hazards of the dangerous goods covered.

For example:

GUIDE 124 - Gases-Toxic and/or Corrosive-Oxidizing.

Each guide is divided into three main sections: the first section describes <u>potential hazards</u> that the material may display in terms of fire/explosion and health effects upon exposure. The highest potential is listed first. The emergency responder should consult this section first. This allows the responder to make decisions regarding the protection of the emergency response team as well as the surrounding population.

The second section outlines suggested <u>public safety</u> measures based on the situation at hand. It provides general information regarding immediate isolation of the incident site, recommended type of protective clothing and respiratory protection. Suggested evacuation distances are listed for small and large spills and for fire situations (fragmentation hazard). It also directs the reader to consult the tables listing Toxic Inhalation Hazard (TIH) (PIH in the US) materials, chemical warfare agents and water-reactive materials (green-bordered pages) when the material is highlighted in the yellow-bordered and blue-bordered pages.

The third section covers <u>emergency response</u> actions, including first aid. It outlines special precautions for incidents which involve fire, spill or chemical exposure. Several recommendations are listed under each part which will further assist in the decision making process. The information on first aid is general guldance prior to seeking medical care.

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their Lethal Concentration 50 (LC50); for example, TIH Zone A is more toxic than Zone D. All distances which are listed in the green-bordered pages are calculated by the use of mathematical models for each TIH material. For the assignment of hazard zones refer to the glossary.

Table 2 lists, by ID number order, materials that produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water and identifies the TIH gases produced. These Water Reactive materials are easily identified in Table 1 as their name is immediately followed by (when spilled in water). Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (UN1746), Thionyl chloride (UN1836), etc.). In these instances, two entries are provided in Table 1 for land-based and water-based spills. If the Water Reactive material is NOT a TIH, and this material is NOT spilled in water, Table 1 and Table 2 do not apply and safety distances will be found within the appropriate orange-bordered guide.

Table 3 provides, by alphabetical order of material name, initial isolation and protective action distances for six Toxic Inhalation Hazard materials that may be more commonly encountered. The selected materials are:

- Ammonia, anhydrous (UN1005)
- Chlorine (UN1017)
- Ethylene oxide (UN1040)
- Hydrogen chloride, anhydrous (UN1050) and Hydrogen chloride, refrigerated liquid (UN2186)
- Hydrogen fluoride, anhydrous (UN1052)
- Sulfur dioxide/Sulphur dioxide (UN1079)

The table provides Initial Isolation and Protective Action Distances for large spills (more than 208 liters or 55 US gallons) involving different container types (therefore different volume capacities) for day-time and night-time situations and different wind speeds.

Isolation and Evacuation Distances

Isolation or evacuation distances are shown in the guides (orange-bordered pages) and in the Table 1 - Initial Isolation and Protective Action Distances (green-bordered pages). This may confuse users not thoroughly familiar with ERG2016.

It is important to note that some guides refer only to non-TIH (PIH in the US) materials (37 guides), some refer to both TIH and non-TIH materials (21 guides) and some (5 guides) refer only to TIH or Water-reactive materials (WRM). A guide refers to both TIH and non-TIH materials (for example see GUIDE 131) when the following sentence appears under the title EVACUATION-Spill: "See Table 1 - Initial Isolation and Protective Action Distances for highlighted materials. For non-highlighted materials, increase, in the downwind direction, as necessary, the isolation distance shown under 'PUBLIC SAFETY." A guide refers only to TIH

4-Green-bordered pages: This section contains three tables.

Table 1 lists, by ID number order, TIH (PIH in the US) materials, including certain chemical warfare agents, and water-reactive materials which produce toxic gases upon contact with water. This table provides two different types of recommended safe distances which are "Initial isolation distances" and "Protective action distances". The materials are highlighted in green for easy identification in both numeric (yellow-bordered pages) and alphabetic (blue-bordered pages) lists of the guidebook. This table provides distances for both small (approximately 208 liters (55 US galions) or less for liquids and 300 kilograms (660 pounds) or less for solids when spilled in water) and large spills (more than 208 liters (55 US galions) for liquids and more than 300 kilograms (660 pounds) or solids when spilled in water) for all highlighted materials. The list is further subdivided into daytime and nighttime situations. This is necessary due to varying atmospheric conditions which greatly affect the size of the hazardous area. The distances change from daytime to nighttime due to different mixing and dispersion conditions in the air. During the night, the air is generally calmer and this causes the material to disperse less and therefore create a toxic zone which is greater than would usually occur during the day, During the day, a more active atmosphere will cause a greater dispersion of the material resulting in a lower concentration of the material in the surrounding air. The actual area where toxic levels are reached will be smaller (due to increased dispersion). In fact, it is the quantity or concentration of the material vapor that poses problems not its mere presence.

The "Initial Isolation Distance" is a distance within which all persons should be considered for evacuation in all directions from the actual spil/leak source. It is a distance (radius) which defines a circle (Initial Isolation Zone) within which persons may be exposed to dangerous concentrations upwind of the source and may be exposed to life-threatening concentrations downwind of the source. For example, in the case of Compressed gas, toxic, n.o.s., UN1955, Inhalation Hazard Zone A, the isolation distance for small spills is 100 meters (300 feet), therefore, representing an evacuation circle of 200 meters (600 feet) in diameter.

For the same material, the "Protective Action Distance" for a small spill is 0.5 kilometers (0.3 miles) for a daytime incident and 2.5 kilometers (1.6 miles) for a nightlime incident, these distances represent a downwind distance from the spill/leak source within which Protective Actions could be implemented. Protective Actions are those steps taken to preserve the health and safety of emergency responders and the public, People in this area could be evacuated and/or sheltered in-place. For more information, consult pages 289 to 295.

Toxic Inhalation Hazard (TIH) Materials

A TIH (PIH in the US) material is a gas or volatile liquid which is known to be so toxic to humans as to pose a hazard to health during transportation, or in the absence of adequate data on human toxicity, is presumed to be toxic to humans because when tested on laboratory animals it has a Lethal Concentration 50 (LCS0) value of not more than 5000 ppm.

It is important to note that even though the term zone is used, the hazard zones do not represent any actual area or distance. The assignment of the zones is strictly a function of

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or WRM materials (for example see GUIDE 124) when the following sentence appears under the fille EVACUATION-Spill: "See Table 1 - Initial Isolation and Protective Action Distances". If the previous sentences do not appear in a guide, then this particular guide refers only to non-TIH materials (for example see GUIDE 128).

In order to identify appropriate isolation and protective action distances, use the following:

If you are dealing with a TIH/WRM/Chemical warfare material (highlighted entries in the index lists), the isolation and evacuation distances are found directly in the green-bordered pages. The guides (orange-bordered pages) also remind the user to refer to the green-bordered pages for evacuation-specific information involving highlighted materials.

If you are dealing with a non-TIH material but the guide refers to both TIH and non-TIH materials, an immediate isolation distance is provided under the heading PUBLIC SAFETY as a precautionary measure to prevent injuries. It applies to the non-TIH materials only. In addition, for evacuation purposes, the guide informs the user under the title EVACUATION-Spill to increase, for non-highlighted materials, in the downwind direction, if necessary, the immediate isolation distance listed under "PUBLIC SAFETY". For example, GUIDE 131 – Flammable Liquids-Toxic, instructs the user to: 'As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all directions.' In case of a large spill, the isolation area could be expanded from 50 meters (150 feet) to a distance deemed as safe by the on-scene commander and emergency responders.

If you are dealing with a non-TIH material and the guide refers only to non-TIH materials, the immediate isolation and evacuation distances are specified as actual distances in the guide (orange-bordered pages) and are not referenced in the green-bordered pages.

- Note 1: If an entry is highlighted in green in either the yellow-bordered or blue-bordered pages AND THERE IS NO FIRE, go directly to Table 1 Initial Isolation and Protective Action Distances (green-bordered pages) and look up the ID number and name of material to obtain initial isolation and protective action distances. IF A FIRE IS INVOLVED, ALSO CONSULT the assigned guide (orange-bordered pages) and apply as appropriate the evacuation information shown under PUBLIC SAFETY.
- Note 2: If the name in Table 1 is shown with "(when spilled in water)", these materials produce large amounts of Toxic Inhalation Hazard (TIH) gases when spilled in water. Some Water Reactive materials are also TIH materials themselves (e.g., Bromine trifluoride (UN1746), Thionyl chloride (UN1836), etc.). In these instances, two entries are provided in Table 1 for land-based and water-based spills. If the Water Reactive material is NOT a TIH and this material is NOT spilled in water, Table 1 and Table 2 do not apply and safety distances will be found within the appropriate orange-bordered guide.

PROTECTIVE CLOTHING

Street Clothing and Work Uniforms. These garments, such as uniforms worn by police and emergency medical services personnel, provide almost no protection from the harmful effects of dangerous goods.

Structural Fire Fighters' Protective Clothing (SFPC). This category of clothing, often called turnout or bunker gear, means the protective clothing normally worn by fire fighters during structural fire fighting operations. It includes a helmet, coat, pants, boots, gloves and a hood to cover parts of the head not protected by the helmet and facepiece. This clothing must be used with full-facepiece positive pressure self-contained breathing apparatus (SCBA). This protective clothing should, at a minimum, meet the OSHA Fire Brigades Standard (29 CFR 1910.156). Structural fire fighters' protective clothing provides limited protection from heat and cold, but may not provide adequate protection from the harmful vapors or liquids that are encountered during dangerous goods incidents. Each guide includes a statement about the use of SFPC in incidents involving those materials referenced by that guide. Some guides state that SFPC provides limited protection. In those cases, the responder wearing SFPC and SCBA may be able to perform an expedient, that is, quick "in-and-out", operation. However, this type of operation can place the responder at risk of exposure, injury or death. The incident commander makes the decision to perform this operation only if an overriding benefit can be gained (i.e., perform an immediate rescue, turn off a valve to control a leak, etc.). The coverall-type protective clothing customarily worn to fight fires in forests or wildlands is not SFPC and is not recommended nor referred to elsewhere in this guidebook.

Positive Pressure Self-Contained Breathing Apparatus (SCBA). This apparatus provides a constant, positive pressure flow of air within the facepiece, even if one inhales deeply while doing heavy work. Use apparatus certified by NIOSH and the Department of Labor/Mine Safety and Health Administration in accordance with 42 CFR Part 84. Use it in accordance with the requirements for respiratory protection specified in OSHA 29 CFR 1910.134 (Respiratory Protection) and/or 29 CFR 1910.156 (f) (Fire Brigades Standard). Chemical-cartridge respirators or other fillering masks are not acceptable substitutes for positive pressure self-contained breathing apparatus. Demand-type SCBA does not meet the OSHA 29 CFR 1910.156 (f)(1)(i) of the Fire Brigades Standard. If it is suspected that a Chemical Warfare Agent (CW) is involved, the use of NIOSH-certified respirators with CBRN protection are highly recommended.

Respirators. N95 respirator is the most common of the seven types of particulate filtering facepiece respirators. This product filters at least 95% of airborne particles (0.3 microns) but is not resistant to oil. N95 filtering facepiece respirators do not provide protection against gas and vapor exposures. PAPR (Powered Air-Purifying Respirator) is an air-purifying respirator that uses a blower to force ambient air through the air-purifying cartridge or filter into the facepiece. A PAPR is not a supplied-air respirator. A PAPR does not supply oxygen or air from a separate source (i.e., cylinders).

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FIRE AND SPILL CONTROL

FIRE CONTROL

Water is the most common and generally most available fire extinguishing agent. Exercise caution in selecting a fire extinguishing method since there are many factors to be considered in an incident. Water may be ineffective in fighting fires involving some materials; its effectiveness depends greatly on the method of application.

Fires involving a spill of flammable liquids are generally controlled by applying a fire fighting foam to the surface of the burning material. Fighting flammable liquid fires requires foam concentrate which is chemically compatible with the burning material, correct mixing of the foam concentrate with water and air, and <u>careful application and maintenance</u> of the foam blanket. There are two general types of fire fighting foam: regular and alcohol-resistant. Examples of regular foam are protein-base, fluoroprotein, and aqueous film-forming foam (AFFF). Some flammable liquids, including many petroleum products, can be controlled by applying regular foam. Other flammable liquids, including polar solvents (flammable liquids which are water soluble) such as alcohols and ketones, have different chemical properties. A fire involving these materials cannot be easily controlled with regular foam and requires application of alcohol-resistant foam. Polar solvent fires may be difficult to control and require a higher foam application rate than other flammable liquid fires (see NFPA/ANSI Standards 11 and 11A for further information). Refer to the appropriate guide to determine which type of foam is recommended. Although it is impossible to make specific recommendations for flammable liquids which have subsidiary corrosive or toxic hazards, alcohol-resistant foam may be effective for many of these materials. The emergency response telephone number on the shipping document, or the appropriate emergency response agency, should be contacted as soon as possible for guidance on the proper fire extinguishing agent to use. The final selection of the agent and method depends on many factors such as incident location, exposure hazards, size of the fire, environmental concerns, as well as the availability of extinguishing agents and equipment at the scene.

WATER REACTIVE MATERIALS

Water is sometimes used to flush spills and to reduce or direct vapors in spill situations. Some of the materials covered by the guidebook can react violently or even explosively with water. In these cases, consider letting the fire burn or leaving the spill alone (except to prevent its spreading by diking) until additional technical advice can be obtained. The applicable guides clearly warn you of these potentially dangerous reactions. These materials require technical advice since:

- (1) water getting inside a ruptured or leaking container may cause an explosion;
- water may be needed to cool adjoining containers to prevent their rupturing (exploding) or further spread of the fires;

Chemical Protective Clothing and Equipment. Safe use of this type of protective clothing and equipment requires specific skills developed through training and experience. It is generally not available to, or used by, first responders. This type of special clothing may protect against one chemical, yet be readily permeated by chemicals for which it was not designed. Therefore, protective clothing should not be used unless it is compatible with the released material. This type of special clothing offers little or no protection against heat and/or cold. Examples of this type of equipment have been described as (1) Vapor Protective Suits (NFPA 1991), also known as Totally-Encapsulating Chemical Protective (TECP) Suits or Level A* protection (OSHA 29 CFR 1910.120, Appendix A & B), and (2) Liquid-Splash Protective Suits (NFPA 1992), also known as Level B* or C* protection (OSHA 29 CFR 1910.120, Appendix A & B) or suits for chemical/biological terorism incidents (NFPA 1994), class 1, 2 or 3 Ensembles and Standard CAN/CGSB/CSA-Z1610-11 – Protection of first responders from chemical, biological, radiological, and nuclear (CBRN) events (2011). No single protective clothing material will protect you from all dangerous goods. Do not assume any protective clothing sesistant to cold and/or heat or flame exposure unless it is so certified by the manufacturer (NFPA 1991 5-3 Flammability Resistance Test and 5-6 Cold Temperature Performance Test).

* Consult glossary for additional protection levels under the heading "Protective Clothing".

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- (3) water may be effective in mitigating an incident involving a water-reactive material only if it can be applied at a sufficient flooding rate for an extended period; and
- (4) the products from the reaction with water may be more toxic, corrosive, or otherwise more undesirable than the product of the fire without water applied.

When responding to an incident involving water-reactive materials, take into account the existing conditions such as wind, precipitation, location and accessibility to the incident, as well as the availability of the agents to control the fire or spill. Because there are variables to consider, the decision to use water on fires or spills involving water-reactive materials should be based on information from an authoritative source; for example, a producer of the material, who can be contacted through the emergency response telephone number or the appropriate emergency response agency.

VAPOR CONTROL

Limiting the amount of vapor released from a pool of flammable or corrosive liquids is an operational concern. It requires the use of proper protective clothing, specialized equipment, appropriate chemical agents, and skilled personnel. Before engaging in vapor control, get advice from an authoritative source as to the proper tactics.

There are several ways to minimize the amount of vapors escaping from pools of spilled liquids, such as special foams, adsorbing agents, absorbing agents, and neutralizing agents. To be effective, these vapor control methods must be selected for the specific material involved and performed in a manner that will miligate, not worsen, the incident.

Where specific materials are known, such as at manufacturing or storage facilities, it is desirable for the dangerous goods response team to prearrange with the facility operators to select and stockpile these control agents in advance of a spill. In the field, first responders may not have the most effective vapor control agent for the material available. They are likely to have only water and only one type of fire fighting foam on their vehicles. If the available foam is inappropriate for use, they are likely to use water spray. Because the water is being used to form a vapor seal, care must be taken not to churn or further spread the spill during application. Vapors that do not react with water may be directed away from the site using the air currents surrounding the water spray. Before using water spray or other methods to safely control vapor emission or to suppress ignition, obtain technical advice, based on specific chemical name identification.

BLEVE (Boiling Liquid Expanding Vapor Explosion)

The following section presents, in a two-page format, background information on BLEVEs and includes a chart that provides important safety-related information to consider when confronted with this type of situation involving fluquefied Petroleum Gases (LPG), UN1075. LPGs include the following flammable gases: Butane, UN1011; Butylene, UN1012; Isobutylene, UN1055; Propylene, UN1077; Isobutane, UN1999; and Propane, UN1978.

What are the main hazards from a BLEVE?

The main hazards from a propane or LPG BLEVE are:

- fire
- thermal radiation from the fire
- blast
- projectiles

The danger from these decreases as you move away from the BLEVE centre. The furthest reaching hazard is projectiles.

This information was prepared for Transport Canada, the Canadian Association of Fire Chiefs and the Propane Gas Association of Canada Inc. by Dr. A. M. Birk, Queen's University, Kinoston (Ontario) Canada.

For a video with information on critical safety issues concerning BLEVEs, please visit http://www.tc.gc.ca/eng/tdg/publications-menu-1238.html. This video can be viewed directly on the website. To order a DVD copy of the video, contact us by email at: TDG-RD-TMD@tc.gc.ca.

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ation.		Cooling water flow rate	USgal/min	23	ន	112	158	727	37.	512	716	935
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The data given are approximate and should only be used with extreme caution. These times can vary from situation to situation. LPG tanks have been known to BLEVE within minutes. Therefore, never risk life based on these times.	BLEVE (USE WITH CAUTION)	Approximate time to empty for engulfing fire	Minutes	80	12	22	50	z	28	25	4	\$
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BLEVE - SAFETY PRECAUTIONS

Use with caution. The following table gives a summary of tank properties, critical times, critical distances and cooling water flow rates for various tank sizes. This table is provided to give responders some guidance but it should be used with caution.

Tank dimensions are approximate and can vary depending on the tank design and application

Minimum time to failure is based on severe torch fire impingement on the vapor space of a tank in good condition, and is approximate. Tanks may fail earlier if they are damaged or corroded. Tanks may fail minutes or hours later than these minimum times depending on the conditions. It has been assumed here that the tanks are not equipped with thermal barriers or water spray cooling.

Minimum time to empty is based on an engulfing fire with a properly sized pressure relief valve. If the tank is only partially engulfed, then time to empty will increase (i.e., if tank is 50% engulfed, then the tanks will take twice as long to empty). Once again, it has been assumed that the tank is not equipped with a thermal barrier or water spray.

Tanks equipped with thermal barriers or water spray cooling significantly increase the times to failure and the times to empty. A thermal barrier can reduce the heat input to a tank by a factor of ten or more. This means it could take ten times as long to empty the tank through the Pressure Relief Valve (PRV).

Fireball radius and emergency response distance is based on mathematical equations and is approximate. They assume spherical fireballs and this is not always the case.

Two safety distances for public evacuation. The minimum distance is based on tanks that are launched with a small elevation angle (i.e., a few degrees above horizontal). This is most common for horizontal cylinders. The preferred evacuation distance has more margin of safety since it assumes the tanks are launched at a 45 degree angle to the horizontal. This might be more appropriate if a vertical cylinder is involved.

It is understood that these distances are very large and may not be practical in a highly populated area. However, it should be understood that the risks increase rapidly the closer you are to a BLEVE. Keep in mind that the furthest reaching projectiles tend to come off in the zones 45 degrees on each side of the tank ends.

Water flow rate is based on 5 (√capacity (USgal)) = USgal/min needed to cool tank metal.

Warning: the data given are approximate and should only be used with extreme caution. For example, where times are given for tank failure or tank emptying through the pressure relief valve – these times are typical but they can vary from situation to situation. Therefore, never risk life based on these times.

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CRIMINAL/TERRORIST USE OF CHEMICAL/BIOLOGICAL/RADIOLOGICAL AGENTS

The following is intended to supply information to first responders for use in making a preliminary assessment of a situation that they suspect involves criminal/terrorist use of chemical, biological agents and/or radioactive materials (CBRN). To aid in the assessment, a list of observable indicators of the use and/or presence of a CB agent or radioactive material is provided in the following paragraphs. This section ends with a Safe Standoff Distance Chart for various threats when Improvised Explosive Devices are involved.

DIFFERENCES BETWEEN A CHEMICAL, BIOLOGICAL AND RADIOLOGICAL AGENT

Chemical and biological agents as well as radioactive materials can be dispersed in the air we breathe, the water we drink, or on surfaces we physically contact. Dispersion methods may be as simple as opening a container, using conventional (garden) spray devices, or as elaborate as detonating an improvised explosive device.

Chemical Incidents are characterized by the rapid onset of medical symptoms (minutes to hours) and easily observed signatures (colored residue, dead foliage, pungent odor, dead insects and animals).

Biological Incidents are characterized by the onset of symptoms in hours to days. Typically, there will be no characteristic signatures because biological agents are usually odorless and colorless. Because of the delayed onset of symptoms in a biological incident, the area affected may be greater due to the movement of infected individuals.

Radiological incidents are characterized by the onset of symptoms, if any, in days to weeks or longer. Typically, there will be no characteristic signatures because radioactive materials are usually odorless and colorless. Specialized equipment is required to determine the size of the affected area, and whether the level of radioactivity presents an immediate or long-term health hazard. Because radioactivity is not detectable without special equipment, the affected area may be greater due to the migration of contaminated individuals.

At the levels created by most probable sources, not enough radiation would be generated to kill people or cause severe illness. In a radiological incident generated by a "dirty bomb", or Radiological Dispersal Device (RDD), in which a conventional explosive is detonated to spread radioactive contamination, the primary hazard is from the explosion. However, certain radioactive materials dispersed in the air could contaminate up to several city blocks, creating fear and possibly panic, and requiring potentially costly cleanup.

INDICATORS OF A POSSIBLE CHEMICAL INCIDENT

Dead animals/birds/fish

Not just an occasional road kill, but numerous animals (wild and domestic, small and large), birds, and fish in the same area.

Lack of insect life

If normal insect activity (ground, air, and/or water) is missing, check the ground/water surface/shore line for dead insects. If near water, check for dead fish/aquatic birds.

INDICATORS OF A POSSIBLE CHEMICAL INCIDENT (Continued)

Unexplained odors Smells may range from fruity to flowery to sharp/pungent to

garlic/horseradish-like to bitter almonds/peach kernels to newly mown hay. It is important to note that the particular odor is completely out of character with its surroundings.

Unusual numbers of dying or sick people (mass casualties)

Pattern of casualties

Health problems including nausea, disonentation, difficulty in breathing, convulsions, localized sweating, conjunctivitis (reddening of eyes/nerve agent symptoms), erythema

(reddening of skin/vesicant symptoms) and death.

Casualties will likely be distributed downwind, or if indoors, by the air ventilation system.

Numerous individuals experiencing unexplained water-like Blisters/rashes blisters, weals (like bee stings), and/or rashes.

Illness in confined area Different casualty rates for people working indoors versus outdoors dependent on where the agent was released.

Unusual liquid droplets Numerous surfaces exhibit oily droplets/film; numerous water surfaces have an oily film. (No recent rain.)

Different-looking areas Not just a patch of dead weeds, but trees, shrubs, bushes,

food crops, and/or lawns that are dead, discolored, or withered. (No current drought.)

Low-lying cloud/fog-like condition that is not consistent Low-lying clouds with its surroundings.

Unusual metal debris Unexplained bomb/munitions-like material, especially if it

INDICATORS OF A POSSIBLE BIOLOGICAL INCIDENT

Unusual numbers of sick or dying people or animals

Any number of symptoms may occur. Casualties may occur hours to days after an incident has occurred. The time required before symptoms are observed is dependent on the agent used.

Unscheduled and unusual spray being disseminated

Especially if outdoors during periods of darkness.

Abandoned spray devices Devices may not have distinct odors,

INDICATORS OF A POSSIBLE RADIOLOGICAL INCIDENT

Radiation Symbols

Containers may display a "propeller" radiation symbol. Unexplained bomb/munitions-like material.

Unusual metal debris

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Initial actions to consider in a potential CBRN/Hazmat Terrorism Event:

- · Avoid using cell phones, radios, etc. within 100 meters (300 feet) of a suspect device
- · NOTIFY your local police by calling 911.
- · Set up Incident command upwind and uphill of the area.
- · Do NOT touch or move suspicious packages/containers.
- Be cautious regarding potential presence of secondary devices (e.g. Improvised Explosive Devices (IEDs)).
- · Avoid contamination:
- · Limit access to only those responsible for rescue of victims or assessment of unknown materials or devicés
- · Evacuate and isolate individuals potentially exposed to dangerous goods/hazardous
- Isolate contaminated areas and secure the scene for analysis of material.

Decontamination measures. Emergency responders should follow standard decontamination procedures (flush-strip-flush). Mass casualty decontamination should begin as soon as possible by stripping (all clothing) and flushing (soap and water). If biological agents are involved or suspected, careful washing and use of a brush are more effective. If chemical agents are suspected, the most important and effective decontamination will be the one done within the first one or two minutes. If possible, further decontamination should be performed using a 0.5% hypochlorite solution (1 part household bleach mixed with 9 parts water). If biological agents are suspected, a contact time of 10 to 15 minutes should be allowed before rinsing. The solution can be used on soft tissue wounds, but must not be used in eyes or open wounds of the abdomen, chest, head, or spine. For further information contact the agencies listed in this guidebook.

For persons contaminated with radioactive material, remove them to a low radiation area if necessary. Remove their clothing and place it in a clearly marked and sealed receptacle, such as a plastic bag, for later testing. Use decontamination methods described above, but avoid breaking the skin, e.g., from shaving, or overly vigorous brushing. External radiological contamination on intact skin surface rarely causes a high enough dose to be a hazard to either the contaminated person or the first responders. For this reason, except in very unusual circumstances, an injured person who is also radiologically contaminated should be medically stabilized, taking care to minimize the spread of the contamination to the extent possible, before decontamination measures are initiated.

The above information was developed in part by the Department of National Defence (Canada), the U.S. Department of the Army, Aberdeen Proving Ground and the Federal Bureau of Investigation (FBI).

INDICATORS OF A POSSIBLE RADIOLOGICAL INCIDENT (continued)

Heat-emitting material Material that is hot or seems to emit heat without any sign

of an external heat source.

Glowing material Strongly radioactive material may emit or cause

Sick people/animals In very improbable scenarios there may be unusual numbers of sick or dying people or animals. Casualties may occur hours to days or weeks after an incident has occurred. The time required before symptoms are observed is dependent on the radioactive material used, and the dose received. Possible symptoms include skin

reddening or vomiting.

PERSONAL SAFETY CONSIDERATIONS

When approaching a scene that may involve CB agents or radioactive materials, the most critical consideration is the safety of oneself and other responders. Protective clothing and respiratory protection of appropriate level of safety must be used. In incidents where it is suspected that CBRN materials have been used as weapons, NIOSH-certified respirators with CBRN protection are highly recommended. Be aware that the presence and identification of CB agents or radioactive materials may not be verifiable, especially in the case of biological or radiological agents. The following actions/measures to be considered are applicable to either a chemical, biological or radiological incident. The guidance is general in nature, not all encompassing, and its applicability should be evaluated on a case-by-case basis.

Approach and response strategies. Protect yourself and use a safe approach (minimize any exposure time, maximize the distance between you and the item that is likely to harm you, use cover as protection and wear appropriate personal protective equipment and respiratory protection). Identify and estimate the hazard by using indicators as provided above. Isolate the area and secure the scene; potentially contaminated people should be isolated and decontaminated as soon as possible. To the extent possible, take measures to limit the spread of contamination. In the event of a chemical incident, the fading of chemical odors is not necessarily an indication of reduced vapor concentrations. Some chemicals deaden the senses giving the false perception that the chemical is no longer present.

If there is any indication that an area may be contaminated with radioactive materials, including the site of any non-accidental explosion, responder personnel should be equipped with radiation detection equipment that would alert them if they are entering a radiologically compromised environment, and should have received adequate training in its use. This equipment should be designed in such a way that it can also alert the responders when an unacceptable ambient dose rate or ambient dose has been reached.

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Improvised Explosive Device (IED) SAFE STAND-OFF DISTANCE	Explosives Capacity' Evacuation Distance* Shelter-in-Place Zone Evacuation Distance*	70ft 21m / 77-11,199.ft 22-365m +1,200 ft 366m	Der 2015 9-4g 110 ft 34 m //1/1099 ft 35-5/8 m +1,700 ft 5/9 m	150 tr. 46 m 151 tr. 1849 150 tr. 1850 m 151 tr. 1849 m 1750 tr. 1850 m 1750 tr. 1854 m	800 bs 727 kg 320 ft 98 m 221-1,899 ft 390 ft 580 m	1000 USS 454 NQ 400 ft 122 m 401 - 2,599 ft 122 173 m + 2,400 ft 722 m	1,199 med; 1-381 med; 1-381 med; 1-381 med; 1-381 med; 1-381 med; 1-381 med; 1-381 med; 1-381 med; 1-381 med;	ater Truck 10,000 bs 4,506 kg 860 ft 263 m 785 5,099 ft 1854 -1,554 m +5,100 ft 1,535 m	90,000 bs 77,216/kg 1,570 ft 475 m 1,571 9,599/ft 475,2,294 m +9,300 ft 2,835 m
Improvised Explosive SAFE STAND-OFF D		2.3 kg	20 lbs	50 lbs 23 kg	227 kg	454 kg	4,000 lbs	10,000 lbsi 4,536 kg	
	Threat Description	Pipe Bomb	Suicide Bomber	Briefcase/Sultcase	Car	SUV/Van	Small Delivery Truck	Container/Water Truck	Semi-Trailer
			¢	nelsviu	рэ ТИТ)	sevisol	дхэ цві	1458	

Soverned by the greater of fragment vote that the pipe bomb, suicide bom imount of explosives in a vehicle.

a container or vehicle. Variations possible

Governed by the ability of an unreinforced

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-740 			# 1.		
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	9 kg	45 kg	907 kg / 1,893 L	3,630 kg/7,570 L	8,144 kg/37,850 L
ume			8	88	18,144
lo//sa					
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Based on the maximum amount of material that could reasonably fit into a container or vehicle. Variations possible

filled with

Note that an LPG tank

pproximately 4 times the flame

GLOSSARY

Adsorption

In this quidebook, means a process by which a gas adheres to the surface of a solid but does not penetrate it, such as in adsorption

of gases by activated carbon (charcoal).

AEGL(s)

Acute Exposure Guideline Level(s), AEGLs represent threshold exposure limits for the general public after a once-in-a-lifetime, or rare, exposure and are applicable to emergency exposure periods ranging from 10 minutes to 8 hours. Three levels AEGL-1, AEGL-2 and AEGL-3 are developed for each of five exposure periods (10 and 30 minutes, 1 hour, 4 hours, and 8 hours) and are distinguished by varying degrees of severity of toxic effects; see AEGL-1, AEGL-2 and AEGL-3.

AEGL-1

AEGL-1 is the airborne concentration (expressed as parts per million or milligrams per cubic meter [ppm or mg/m3]) of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic, non-sensory effects. However, the effects are not disabling and are transient

and reversible upon cessation of exposure.

AEGL-2

AEGL-2 is the airborne concentration (expressed as ppm or mg/m³) of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects

or an impaired ability to escape.

AEGL-3

AEGL-3 is the airborne concentration (expressed as ppm or mg/m3) of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Alcohol-resistant foam

A foam that is resistant to "polar" chemicals such as ketones and esters which may break down other types of foam

Biological agents

Living organisms that cause disease, sickness and mortality in humans. Anthrax and Ebola are examples of biological agents.

Refer to GUIDE 158.

Blister agents (vesicants) Substances that cause blistering of the skin. Exposure is through

liquid or vapor contact with any exposed tissue (eyes, skin, lungs). Mustard (H), Distilled Mustard (HD), Nitrogen Mustard (HN) and Lewisite (L) are blister agents.

Symptoms: Red eyes, skin irritation, burning of skin, blisters,

upper respiratory damage, cough, hoarseness

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GLOSSARY

Blood agents

Substances that injure a person by interfering with cell respiration (the exchange of oxygen and carbon dioxide between blood and tissues). Hydrogen cyanide (AC) and Cyanogen chloride (CK) are blood agents

Symptoms: Respiratory distress, headache, unresponsiveness, seizures, coma.

Burn

Refers to either a chemical or thermal burn, the former may be caused by corrosive substances and the latter by liquefied cryogenic gases, hot molten substances, or flames.

Carcinogen

A substance or mixture which induces cancer or increases its

Category A

An infectious substance that poses a high risk to the health of individuals and/or animals or public health. These substances can cause serious disease and can lead to death. Effective treatment and preventative measures may not be available.

Category B

An infectious substance that ooses a low to moderate risk to individuals and/or animals and/or public health. These substances are unlikely to cause serious disease. Effective treatment and preventative measures are available.

CBBN

Chemical, biological, radiological or nuclear warfare agent.

Choking agents

Substances that cause physical injury to the lungs. Exposure is through inhalation. In extreme cases, membranes swell and lungs become filled with fiquid (pulmonary edema). Death results from lack of oxygen; hence, the victim is "choked". Phosgene (CG) is a choking agent.

Symptoms: Irritation to eyes/nose/throat, respiratory distress, nausea and vomiting, burning of exposed skin.

CO, Cold zone Carbon dioxide gas.

Area where the command post and support functions that are necessary to control the incident are located. This is also referred to as the clean zone, green zone or support zone in other documents. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

Combustible liquid

Liquids which have a flash point greater than 60°C (140°F) and below 93°C (200°F). U.S. regulations permit a flammable liquid with a flash point between 38°C (100°F) and 60°C (140°F) to be reclassed as a combustible liquid.

GLOSSARY

Compatibility Group

Letters identify explosives that are deemed to be compatible. The definition of these Compatibility Groups in this Glossary are intended to be descriptive. Please consult the transportation of dangerous goods/hazardous materials or explosives regulations of your jurisdiction for the exact wording of the definitions. Class 1 materials are considered to be "compatible" if they can be transported together without significantly increasing either the probability of an incident or, for a given quantity, the magnitude of the effects of such an incident.

- Substances which are expected to mass detonate very soon after fire reaches them.
- В Articles which are expected to mass detonate very soon after fire reaches them.
- Substances or articles which may be readily ignited and burn violently without necessarily exploding
- Substances or articles which may mass detonate (with blast and/or fragment hazard) when exposed to fire.

E&F Articles which may mass detonate in a fire.

- Substances and articles which may mass explode and give off smoke or toxic gases
- Articles which in a fire may eject hazardous projectiles and dense white smoke.
- Articles which may mass exolode.
- Κ Articles which in a fire may eject hazardous projectiles
- Substances and articles which present a special risk and could be activated by exposure to air or water.
- Article's which contain only extremely insensitive detonating substances and demonstrate a negligible probability of accidental ignition or propagation.
- Packaged substances or articles which, if accidentally initiated, produce effects that are usually confined to the immediate vicinity.

GLOSSARY

Control zones

Designated areas at dangerous goods incidents, based on safety and the degree of hazard. Many terms are used to describe control zones; however, in this guidebook, these zones are defined as the hot/exclusion/red/restricted zone, warm/contamination reduction/yellow/limited access zone, and cold/support/green/ clean zoné. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

Cryogenic liquid

A refrigerated, liquefied gas that has a boiling point colder than -90°C (-130°F) at atmospheric pressure.

Decomposition products Products of a chemical or thermal break-down of a substance. Decontamination

The removal of dangerous goods from personnel and equipment to the extent necessary to prevent potential adverse health effects. Always avoid direct or indirect contact with dangerous goods; however, if contact occurs, personnel should be decontaminated as soon as possible. Since the methods used to decontaminate personnel and equipment differ from one chemical to another, contact the chemical manufacturer, through the agencies listed on the inside back cover, to determine the appropriate procedure. Contaminated clothing and equipment should be removed after use and stored in a controlled area (warm/contamination reduction/yellow/limited access zone) until cleanup procedures

cannot be decontaminated and must be disposed of in a proper

Dry chemical

A preparation designed for fighting fires involving flammable liquids, pyrophoric substances and electrical equipment. Common types contain sodium bicarbonate or potassium bicarbonate.

can be initiated. In some cases, protective clothing and equipment

Edema

The accumulation of an excessive amount of watery fluid in cells and tissues. Pulmonary edema is an excessive buildup of water in the lungs, for instance, after inhalation of a gas that is

corrosive to lung tissue.

ERPG(s)

Emergency Response Planning Guideline(s). Values intended to provide estimates of concentration ranges above which one could reasonably anticipate observing adverse health effects; see ERPG-1, ERPG-2 and ERPG-3.

GLOSSARY

ERPG-1

The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

ERPG-2

The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

ERPG-3

The maximum airborne concentration below which it is believed nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects.

Flammable liquid Flash point

A liquid that has a flash point of 60°C (140°F) or lower.

Lowest temperature at which a liquid or solid gives off vapor in such a concentration that, when the vapor combines with air near the surface of the liquid or solid, a flammable mixture is formed. Hence, the lower the flash point, the more flammable the material.

Hazard zones (Inhalation Hazard Žones)

HAZARD ZONE A: Gases: LC50 of less than or equal to 200 ppm, Liquids: V equal to or greater than 500 LC50 and LC50 less than or equal to 200 ppm,

HAZARD ZONE B:

ZONE D:

Gases: LC50 greater than 200 ppm and less than or equal to 1000 ppm, Liquids: V equal to or greater than 10 LC50; LC50 less than or equal to 1000 ppm and criteria for Hazard Zone A are not met.

HAZARD LC50 greater than 1000 ppm and less than or ZONE C:

equal to 3000 ppm,

HAZARD LC50 greater than 3000 ppm and less than or

equal to 5000 ppm.

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GLOSSARY

Hot zone

Area immediately surrounding a dangerous goods incident which extends far enough to prevent adverse effects from released dangerous goods to personnel outside the zone. This zone is also referred to as exclusion zone, red zone or restricted zone in other documents. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

IED

See "Improvised Explosive Device"

Immiscible

In this guidebook, means that a material does not mix readily with water.

Improvised Explosive

A bomb that is manufactured from commercial, military or homemade explosives

Large spill

A spill that involves quantities that are greater than 208 liters (55 US gallons) for liquids and greater than 300 kilograms (660 pounds) for solids.

LC50

Lethal concentration 50. The concentration of a material administered by inhalation that is expected to cause the death of 50% of an experimental animal population within a specified time. (Concentration is reported in either ppm or mg/m³)

Mass explosion

MAWP

Explosion which affects almost the entire load virtually instantaneously. Maximum Allowable Working Pressure: The maximum allowable internal pressure that the tank may experience during normal

mq/m3

Milligrams of a material per cubic meter of air.

Miscible mL/m³

In this guidebook, means that a material mixes readily with water. Milliliters of a material per cubic meter of air. (1 mL/m3 equals

1 ppm).

Mutagen

An agent giving rise to an increased occurrence of mutations in populations of cells and/or organisms, Mutation means a permanent change in the amount or structure of the genetic material in a cell.

GLOSSARY

Narcotic

A substance which acts as a central nervous system depressor producing effects such as drowsiness, narcosis, reduced alertness, loss of reflexes, lack of coordination, and vertigo. These effects can also be manifested as severe headache or nausea, and can lead to reduced judgment, dizziness, irritability, fatigue, impaired memory function, deficit in perception and coordination, reaction time, or sleepiness

Nerve agents

Substances that interfere with the central nervous system. Exposure is primarily through contact with the liquid (via skin and eyes) and secondarily through inhalation of the vapor. Tabun (GA), Sarin (GB), Soman (GD) and VX are nerve agents

Symptoms: Pinpoint pupils, extreme headache, severe tightness in the chest, dyspnea, runny nose, coughing, salivation, unresponsiveness, seizures,

These fetters refer to "not otherwise specified". The entries which use this description are generic names such as "Corrosive liquid. n.o.s." This means that the actual chemical name for that corrosive liquid is not listed in the regulations; therefore, a generic name must be used to describe it on shipping papers

Noxious

n.o.s.

In this guidebook, means that a material may be harmful or injurious to health or physical well-being.

Oxidize

PG

рΗ

A chemical which supplies its own oxygen and which helps other combustible material burn more readily.

Packing Group

The Packing Group (PG) is assigned based on the degree of danger presented by the hazardous material:

PG1: Great danger PG II : Medium danger PG III: Minor danger

See "Packing Group".

materials.

See "Polymerization".

pH is a value that represents the acidity or alkalinity of a water solution. Pure water has a pH of 7. A pH value below 7 indicates an acid solution (a pH of 1 is extremely acidic). A pH above 7 indicates an alkaline solution (a pH of 14 is extremely alkaline). Acids and alkalies (bases) are commonly referred to as corrosive

GLOSSARY

PIH

Poison Inhalation Hazard. Term used to describe gases and volatile liquids that are toxic when inhaled. (Same as TIH).

Polar

See "Miscible".

Polymerization

A chemical reaction that often produces heat and pressure. Once initiated, the reaction is accelerated by the heat that it produces. The uncontrolled buildup of heat and pressure can cause a fire or an explosion, or can rupture closed containers. The letter (P) following a guide number in the yellow-bordered and bluebordered pages identifies a material that may polymerize violently under high temperature conditions or contamination with other products. It is also used to identify materials that have a strong potential for polymerization in the absence of an inhibitor due to depletion of this inhibitor caused by accident conditions.

ppm

Parts per million. (1 ppm equals 1 mL/m3).

Protective clothing

includes both respiratory and physical protection. One cannot assign a level of protection to clothing or respiratory devices separately. These levels were accepted and defined by response organizations such as U.S. Coast Guard, NIOSH, and U.S. EPA.

Level A:

SCBA plus totally encapsulating chemical resistant clothing (permeation resistant)

Level B:

SCBA plus hooded chemical resistant clothing (splash suit).

Full or half-face respirator plus hooded chemical

Level C: Level D:

resistant clothing (splash suit). Coverall with no respiratory protection.

Pyrophoric

A material which ignites spontaneously upon exposure to air

Radiation Authority

As referred to in GUIDES 161 through 166 for radioactive materials, the Radiation Authority is either a Federal, state/provincial agency or state/province designated official. The responsibilities of this authority include evaluating radiological hazard conditions during normal operations and during emergencies. If the identity and telephone number of the authority are not known by emergency responders, or included in the local response plan, the information can be obtained from the agencies listed on the inside back cover. They maintain a periodically updated list of radiation authorities.

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GLOSSARY

Radioactivity

The property of some substances to emit invisible and potentially

Refrigerated liquid Respiratory sensitizer See "Cryogenic liquid".

A substance that induces hypersensitivity of the airways following

inhalation of the substance

Right-of-way

A defined area on a property containing one or more high-pressure natural gas pipelinės

Shelter in-place

Skin irritation

Small spill

People should seek shelter inside a building and remain inside until the danger passes. Sheltering in-place is used when evacuating the public would cause greater risk than staying where they are, or when an evacuation cannot be performed. Direct the people inside to close all doors and windows and to shut off all ventilating, heating and cooling systems. In-place protection (shelter in-place) may not be the best option if (a) the vapors are flammable, (b) if it will take a long time for the gas to clear the area; or (c) if buildings cannot be closed tightly. Vehicles can offer some protection for a short period if the windows are closed and the ventilating systems are shut off. Vehicles are not as effective as buildings for in-place protection.

Skin corrosion

The production of irreversible damage to the skin following the application of a test substance for up to 4 hours.

The production of reversible damage to the skin following the application of a test substance for up to 4 hours.

Skin sensitizer A substance that will induce an allergic response following skin

A spill that involves quantities that are less than 208 liters (55 US gallons) for liquids and less than 300 kilograms (660 pounds)

Specific gravity Weight of a substance compared to the weight of an equal volume of water at a given temperature. Specific gravity less than 1 indicates a substance is lighter than water; specific gravity greater

than 1 indicates a substance is heavier than water.

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GLOSSARY

Straight (solid) stream

Method used to apply or distribute water from the end of a hose. The water is delivered under pressure for penetration. In an efficient straight (solid) stream, approximately 90% of the water passes through an imaginary circle 38 cm (15 inches) in diameter at the breaking point. Hose (solid or straight) streams are frequently used to cool tanks and other equipment exposed to flammable flquid fires, or for washing burning spills away from danger points. However, straight streams will cause a spill fire to spread if improperly used or when directed into open containers of flammable and combustible liquids.

TIH

Toxic Inhalation Hazard. Term used to describe gases and volatile liquids that are toxic when inhaled. (Same as PIH).

Saturated vapor concentration in air of a material in mL/m3 (volatility) at 20°C and standard atmospheric pressure.

Vapor density

Weight of a volume of pure vapor or gas (with no air present) compared to the weight of an equal volume of dry air at the same temperature and pressure. A vapor density less than 1 (one) indicates that the vapor is lighter than air and will tend to rise. A vapor density greater than 1 (one) indicates that the vapor is heavier than air and may travel along the ground.

Vapor pressure

Pressure at which a liquid and its vapor are in equilibrium at a given temperature. Liquids with high vapor pressures evaporate rapidly.

Viscosity

Measure of a liquid's internal resistance to flow. This property is important because it indicates how fast a material will leak out through holes in containers or tanks.

Warm zone

Area between Hot and Cold zones where personnel and equipment decontamination and hot zone support take place. It includes control points for the access corridor and thus assists in reducing the spread of contamination. Also referred to as the contamination reduction corridor (CRC), contamination reduction zone (CRZ), yellow zone or limited access zone in other documents. (EPA Standard Operating Safety Guidelines, OSHA 29 CFR 1910.120, NFPA 472).

Water Reactive Material For the purpose of this guidebook, produces significant toxic gas when it comes in contact with water

Water-sensitive

Substances which may produce flammable and/or toxic decomposition products upon contact with water.

Water spray (fog)

Method or way to apply or distribute water. The water is finely divided to provide for high heat absorption. Water spray patterns can range from about 10 to 90 degrees. Water spray streams can be used to extinguish or control the burning of a fire or to provide exposure protection for personnel, equipment, buildings, etc. (This method can be used to absorb vapors, knockdown vapors or disperse vapors. Direct a water spray (fog), rather than a straight (solid) stream, into the vapor cloud to accomplish any of the above)

GLOSSARY

Water spray is particularly effective on fires of flammable liquids and volatile solids having flash points above 37.8°C (100°F)

Regardless of the above, water spray can be used successfully on flammable liquids with low flash points. The effectiveness depends particularly on the method of application. With proper nozzles, even gasoline spill fires of some types have been extinguished when coordinated hose lines were used to sweep the flames off the surface of the liquid. Furthermore, water spray carefully applied has frequently been used with success in extinguishing fires involving flammable liquids with high flash points (or any viscous liquids) by causing frothing to occur only on the surface, and this foaming action blankets and extinguishes the fire.

PUBLICATION DATA

The 2016 Emergency Response Guidebook (ERG2016) was prepared by the staff of Transport Canada, the U.S. Department of Transportation, and the Secretariat of Communications and Transport of Mexico with the assistance of many interested parties from government and industry including the collaboration of CIQUIME of Argentina. The original authors of the ERG are Transport Canada's Michel Clouller and U.S. DOT's George Cushmac, Printing and publication services are provided through U.S. DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA), Outreach, Training, and Grants Division.

ERG2016 is based on earlier Transport Canada, U.S. DOT, and Secretariat of Communications and Transport emergency response guidebooks. ERG2016 is published in three languages: English, French and Spanish. The Emergency Response Guidebook has been translated and printed in other languages, including Chinese, German, Hebrew, Japanese, Portuguese, Korean, Hungarian, Polish, Turkish and Thai.

We encourage countries that wish to translate this Guidebook to please contact any of the websites or telephone numbers in the next paragraph.

DISTRIBUTION OF THIS GUIDEBOOK

The primary objective is to place one copy of the ERG2016 in each publicly owned emergency service vehicle through distribution to Federal, state, provincial and local public safety authorities. The distribution of this guidebook is being accomplished through the voluntary cooperation of a network of key agencies. Emergency service organizations that have not yet received copies of ERG2016 should contact the respective distribution center in their country, state or province. In the U.S., information about the distribution center for your location may be obtained from the Office of Hazardous Materials Safety website at http://phmsa.dot. gov/hazmat/outreach-training/erg or call 202-366-4900. In Canada, contact CANUTEC at 613-992-4624 or via the website at http://www.lc.gc.ca/canutec for information. In Mexico, call SCT at 50-11-92-20, 50-11-92-40 or 50-11-92-70 or via email at iflores@sct.gob.mx. In Argentina, call CIQUIME at 011-4611-2007, or via the website at http://www.ciquime.org.ar, or via email at gre2016@ciquime.org.ar.

REPRODUCTION AND RESALE

Copies of this document which are provided free-of-charge to fire, police and other emergency services may not be resold. ERG2016 (PHH50-ERG2016) may be reproduced without further permission subject to the following:

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The Emergency Response Guidebook is normally revised and reissued every four years. However, in the event of a significant mistake, omission or change in the state of knowledge, special instructions to change the guidebook (in pen-and-ink, with paste-over stickers, or with a supplement) may be issued.

Users of this guidebook should check periodically (about every 6 months) to make sure their version is current. Changes should be annotated below. Contact:

DOT/PHMSA

http://phmsa.dot.gov/hazmat/outreach-training/erg

TRANSPORT CANADA

https://www.tc.gc.ca/eng/canutec/menu.htm

CIQUIME

http://www.ciquime.org.ar

This guidebook incorporates changes dated:

Constructive comments concerning ERG2016 are solicited; in particular, comments concerning its use in handling incidents involving dangerous goods. Comments should be addressed to:

In Canada:

Director, CANUTEC Transport Dangerous Goods Transport Canada Ottawa, Ontario Canada K1A 0N5

Phone: 613-992-4624 (information) Fax: 613-954-5101 Email: canutec@tc.gc.ca

In the U.S.:

U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Outreach, Training, and Grants Division (PHH-50) Washington, DC 20590-0001

Phone: 202-366-4900 Fax: 202-366-7342 Email: ERGComments@dot.gov

In Mexico:

Secretariat of Communications and Transportation Federal Motor Carrier General Direction Deputy General Director for Standards, Technical Specifications and Motor Carrier Safety Calz, de las Bombas No. 411 2nd floor Col. Los Girasoles Del. Coyoacan C.P.04920

Mexico D.F. Phone: (+52) (55) 50-11-92-20, (55) 50-11-92-40 and (55) 50-11-92-70

In Argentina:

Centro de Información Química para Emergencias (CIQUIME) Juan Bautista Alberdi 2986 C1406GSS Buenos Aires, Argentina Phone: +54-11-4611-2007 Fax +54-11-4613-3707 Email: gre2016@ciquime.org.ar

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CANADA AND UNITED STATES NATIONAL RESPONSE CENTERS

CANADA

CANUTEC is the Canadian Transport Emergency Centre operated by the

Transportation of Dangerous Goods Directorate of Transport Canada.

CANUTEC provides a national bilingual (French and English) advisory service and is staffed by professional scientists experienced and trained in interpreting technical information and providing emergency response advice.

in an emergency, CANUTEC may be called at 1-888-CANUTEC (226-8832) or collect at 613-996-6666 (24 hours) *666 cellular (Press Star 666, Canada only)

In a non-emergency situation, please call the information line at 613-992-4624 (24 hours).

2. PROVINCIAL/TERRITORIAL AGENCIES

Although technical information and emergency response assistance can be obtained from CANUTEC, there are federal, provincial and territorial regulations requiring the reporting of dangerous goods incidents to certain authorities.

The following list of provincial/territorial agencies is supplied for your convenience.

Province	Emergency Authority and/or Telephone Number
Alberta	Local Police and Provincial Authorities 1-800-272-9600 or 780-422-9600
British Columbia	Local Police and Provincial Authorities 1-800-663-3456
Manitoba	Provincial Authority 204-945-4888 and Local Police or fire brigade, as appropriate
New Brunswick	Local Police or 1-800-565-1633
Newfoundland and Labrador	Local Police and 709-772-2083
Northwest Territories	867-920-8130
Nova Scotia	Local Police or 1-800-565-1633
Nunavut	Local Police and 867-920-8130
Ontario	Local Police
Prince Edward Island	Local Police or 1-800-565-1633
Quebec	Local Police
Saskatchewan	Local Police or 1-800-667-7525
Yukon Territory	867-667-7244

NOTE:

- The appropriate federal agency must be notified in the case of rail, air or marine incidents,
- The nearest police department must be notified in the case of lost, stolen or misplaced explosives, radioactive materials or infectious substances.
- CANUTEC must be notified in the case of:
 - lost, stolen or unlawfully interfered with dangerous goods (except Class 9);
 - an incident involving infectious substances;
 - an accidental release from a cylinder that has suffered a catastrophic failure;
 - an incident where the shipping documents display CANUTEC's telephone number, 1-888-CANUTEC (226-8832) or 613-996-6666, as the emergency telephone
 - a dangerous goods incident in which a railway vehicle, a ship, an aircraft, an aerodrome or an air cargo facility is involved.

Emergency Response Assistance Plans (Applies in Canada ONLY)

An ERAP or Emergency Response Assistance Plan is an approved plan that describes what is to be done in the event of a transportation accident involving certain higher risk dangerous goods. The ERAP is required by the Canadian Transportation of Dangerous Coods Act for dangerous goods that require special expertise and response equipment to respond to an incident. The plan is intended to assist local emergency responders by providing them with technical experts and specially trained and equipped emergency response personnel at the scene of a dangerous goods incident.

The ERAP will describe the specialized response capabilities, equipment and procedures that will be used to support a response to incidents involving high risk dangerous goods. The plan will also address emergency preparedness, including personnel training, response exercises and equipment maintenance. The ERAP plans supplement those of the carrier and of the local and provincial authorities, and must be integrated with other organizations to help mitigate the consequences of an accident.

For shipments that require an ERAP, the ERAP number and the phone number to activate the ERAP will be included on the shipping document. If additional information is required, or to determine if the product involved in the emergency requires an ERAP, contact CANUTEC.

> CANUTEC may be called at 1-888-CANUTEC (226-8832) or collect at 613-996-6666 (24 hours) *666 on cellular phone (Press star 666) In Canada Only

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NOTES

UNITED STATES

NATIONAL RESPONSE CENTER (NRC)

The NRC, which is operated by the U.S. Coast Guard, receives reports required when dangerous goods and hazardous substances are spilled. After receiving notification of an incident, the NPC will immediately notify the appropriate Federal On-Scene Coordinator and concerned Federal agencies. Federal law requires that anyone who releases into the environment a reportable quantity of a hazardous substance (including oil when water is, or may be affected) or a material identified as a marine pollutant, must immediately notify the NRC. When in doubt as to whether the amount released equals the required reporting levels for these materials, the NRC should be notified.

> CALL NRC (24 hours) 1-800-424-8802

(Toll-free in the U.S., Canada, and the U.S. Virgin Islands) 202-267-2675 in the District of Columbia

Calling the emergency response telephone number, CHEMTREC®, CHEMTEL, INC., INFOTRAC or 3E COMPANY, does not constitute compliance with regulatory requirements to call the NRC.

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EMERGENCY RESPONSE TELEPHONE NUMBERS

CANADA

1. CANUTEC, provides a 24 hour national bilingual (French and English) emergency response advisory service:

1-888-CANUTEC (226-8832) or 613-996-6666*
*666 (STAR 666) cellular (in Canada only)

UNITED STATES

1. CHEMTREC®, a 24 hour emergency response communication service:

(Toll-free in the U.S., Canada and the U.S. Virgin Islands) 703-527-3887 For calls originating elsewhere

CHEMTEL, INC., a 24 hour emergency response communication service:
 1-882-25-3924*

(Toll-free in the U.S., Canada, Puerfo Rico and the U.S. Virgin Islands)

(Toll-free in the U.S., Canada, Puerlo Rico and the U.S. Virgin Islands) 813-248-0585 For calls originating elsewhere

352-323-3500 For calls originating elsewhere

4. 3E COMPANY, a 24 hour emergency response communication service: 1-800-451-8346 *

(Toll-free in the U.S., Canada and the U.S. Virgin Islands) 760-602-8703 For calls originating elsewhere

The emergency response information services shown above have requested to be listed as providers of emergency response information and have agreed to provide emergency response information to all callers. They maintain per

MILITARY SHIPMENTS, for assistance at incidents involving materials being shipped by, for, or to the Department of Defense (DOD), call one of the following numbers (24 hours):

703-697-0218 * - Explosives/ammunition incidents (U.S. Army Operations Center)

1-800-851-8061 (Toll-free in the U.S.) - All other dangerous goods incidents (Defense Logistics Agency)

NATIONWIDE POISON CONTROL CENTER (United States only)
 1-800-222-1222 (Toll-free in the U.S.)

* Collect calls are accepted

EMERGENCY RESPONSE TELEPHONE NUMBERS

MEXICO

1. CENACOM

01-800-00-413-00 toll free in the Mexican Republic
For calls originating in Mexico City and the Metropolitan Area: 5128-0000
For calls originating elsewhere, call: 01-55-5128-0000
exts. 36469, 36470, 36471, 36472, 37807, 37808, 37809, 37810, 37811, 37812

2. CONASENUSA

01-800-11-131-68 toll free in the Mexican Republic 24 hours, 365 days

3. SETIQ

01-800-00-214-00 in the Mexican Republic
For calls originating in Mexico City and the Metropolitan Area: 5559-1588
For calls originating elsewhere, call: +52-55-5559-1588

ARGENTINA

. CIQUIME

0-800-222-2933 in the Republic of Argentina For calls originating elsewhere, call: +54-11-4611-2007 (Collect calls are accepted)

BRAZIL

I. PRÓ-QUÍMICA

0-800-118270 (Toll-free in Brazil) For calls originating elsewhere, call: +55-19-3833-5310 (Collect calls are accepted)

COLOMBIA

1. CISPROQUIM

01-800-091-6012 in Colombia
For calls originating in Bogotá, Colombia call: 288-6012
For calls originating elsewhere, call
+57-1-288-6012

CHIL

CITUC QUÍMICO

2-2247-3600 in the Republic of Chile For calls originating elsewhere, call +56-2-2247-3600

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